DOCUMENT RESUME

ED 032 779 24 EM 007 455

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An Experimental Study of the Degree of Affective Response Elicited by Several Mediated and Non-Mediated Instructional Methods. Final Report.

University of Southern California, Los Angeles. Dept. of Instructional Technology.

Spons Agency-Office of Education (DHEW), Washington, D.C. Bureau of Research.

Bureau No-BR-8-I-082

Pub Date Feb 69

Grant-OEG-9-8-081082-0119-010

Note-279p.; Thesis submitted to the School of Education of the University of Southern California, Los Angeles

EDRS Price MF-$1.25 HC-$14.05

Descriptors-*Affective Behavior, Classroom Materials, Films, Instruction, Instructional Aids, Instructional Films, Instructional Materials, Instructional Media, Literature Reviews, *Measurement Instruments, Measurement Techniques, *Media Research, Phonotape Recordings, Research Criteria, Research Design, Slides, Student Motivation, *Teaching Techniques

An experimental study evaluated affective response by students to various teaching media--films, slides, and audio tapes. Goals involved rating the media as to the degree of affective response (emotional involvement or attitudinal learning) each could elicit over non-mediated, teacher presentation of the same material. Affect was defined as increase in interest (measured through capillary pulse pressure) and subsequent action (selecting a book on the subject of instruction). Results showed no significant difference between non-mediated students of different kinds on the variable of interest as measured through capillary pressure, suggesting that this measurement is too insensitive (especially when taken after, not during, testing). Films proved able to elicit more subsequent action (book selections) than all other media combined, and was the only one of the media tested able to create affective response significantly greater than controls. A review of psychological literature and a bibliography are included. (BB)

ED0 32779

DEPARTMENT OF INSTRUCTIONAL TECHNOLOGY

SCHOOL OF
EDUCATION
UNIVERSITY
OF SOUTHERN
CALIFORNIA

Final Report

Project No. 8-I-082
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Department of Instructional Technology
University of Southern California
Los Angeles, California

February 1969

The research reported herein was performed pursuant to a grant with the Office of Education, U. S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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This report also served as
the author's doctoral dissertation
in the School of Education
at the University of Southern California
Los Angeles, California
June, 1969

TABLE OF CONTENTS

Page

LIST OF FIGURES v

LIST OF TABLES vi

Chapter

I. PROBLEM 1

Problems in Instructional Technology 1
Problems in the Affective Domain 8
Problem of This Study 11
Definitions 12
Assumptions 15
Hypotheses 15
Taxonomy 16
Delimitations 17
Organization 18

II. REVIEW OF THE LITERATURE 20

Definitions of Attitude 20
Importance of the Affective Domain 29
Instructional Media and Affective Learning . . 40
Summary and Conclusions of the Chapter 70

III. METHODOLOGY 72

Subjects 72
Dependent Variables 72
Materials 76
Design 81
Field Procedure 86
Statistical Analysis 92

IV. RESULTS 105

Hypothesis One 105
Hypothesis Two 109

Chapter Page

Hypotheses Three and Four 112
Hypotheses Five and Six 129
Hypothesis Seven 147
Assumption One 152
Assumption Two 156
Taxonomy 159
Summary 162

V. SUMMARY, CONCLUSIONS, AND IMPLICATIONS 166

Organization of This Chapter 166
Summary 166
Results and Conclusions 172
Implications 179
Conclusion 189

BIBLIOGRAPHY 191

APPENDIXES 211

A. Transcriptions of Film Narrations 212

B. Sentence Outlines for Teacher Presentations . . 229

C. Teachers' Manual 251

LIST OF FIGURES

Figure | Page

1. A Comparison of Common "Attitudinal" Terms and Attitudinal Components with Terminology from Krathwohl's (1964) *Taxonomy* 30

2. Comparison of Treatment Classes' and Control Class's Pulse Pressure Scores toward the Four Subject Matters 126

LIST OF TABLES

Table Page

1. The Number of Studies Dealing with the Effects of Instructional Media on Cognitive Learning and on Affective Learning as Indicated by the Number of Studies Cited in Two Major Collections of Research Summaries 7

2. Summary of Studies Concerned with ATTITUDE TOWARD MEDIA after Using Media in Instruction 47

3. χ^2 Analysis of the Number of Studies Finding Positive, Neutral, and Negative Attitudes Toward Media 55

4. Summary of Studies Concerned with ATTITUDE TOWARD SUBJECT MATTER After Using Media in Instruction 56

5. χ^2 Analysis of the Number of Studies Finding Positive, Neutral, and Negative Attitudes toward Subject Matter 60

6. Design of the Experiment 87

7. Frequency Distribution of INDIVIDUAL RATIO SCORES for Each of the WORD SLIDES 95

8. Frequency Distribution of FOURTH-Grade INDIVIDUAL RATIO SCORES for Each of the MEDIA SLIDES 97

9. Frequency Distribution of INDIVIDUAL DIFFERENCE SCORES for Each of the WORD SLIDES 98

10. Control Class's CLASS RATIO SCORES for the Four Subject Matters 106

11. Control Class's CLASS DIFFERENCE SCORES for the Four Subject Matters 106

Table Page

12. Analysis of Variance Control Class Class Ratio Scores 106

13. Analysis of Variance Control Class Class Difference Scores 107

14. t-Tests Control Class Class Ratio Scores Compared with Neutrality, 1.00 108

15. t-Tests Control Class Class Difference Scores Compared with Neutrality, 0.00 108

16. Numbers and Proportions of Control Class's Book Selection Responses for the Four Subject Matters 110

17. Chi-square Test Comparing Control Class Observed Selection Numbers with Expected Equal Selection Numbers 110

18. Calculation of Proportion of All Treatment S Selecting Books 111

19. Fifth-Grade Ratios, Number Scores 114

20. Fourth-Grade Ratios, Number Scores 115

21. Fourth-Grade Ratios, Proportions of Highs . . . 116

22. Fourth-Grade Differences, Number Scores 117

23. Fourth-Grade Differences, Proportions of Highs . 118

24. Analysis of Variance Fifth-Grade Ratios, Number Scores 119

25. Analysis of Variance Fourth-Grade Ratios, Number Scores 120

26. Analysis of Variance Fourth-Grade Differences, Proportions of Highs 121

27. Analysis of Variance Fourth-Grade Differences, Number Scores 122

28. Analysis of Variance Fourth-Grade Differences, Proportions of Highs 123

29. Comparison of Treatment Classes' and Control Class's Pulse Pressure Scores toward the Four Subject Matters 125

Table Page

30. Fourth-Grade Proportions of Books Selected after Presentations 130

31. Fifth-Grade Proportions of Books Selected after Presentations 131

32. Fourth-Grade Proportions of Books Selected after Testing 132

33. Analysis of Variance Fourth-Grade Proportions of Books Selected after Presentations 133

34. Analysis of Variance Fifth-Grade Proportions of Books Selected after Presentations 134

35. Analysis of Variance Fourth-Grade Proportions of Books Selected after Testing 135

36. Scheffe Test for Subject Matter Comparisons Fourth-Grade Proportions of Books Selected after Presentations 137

37. Scheffe Test for Subject Matter Comparisons Fourth-Grade Proportions of Books Selected after Testing 137

38. Scheffe Test for Media Comparisons Fourth-Grade Proportions of Books Selected after Presentations 139

39. Scheffe Test for Media Comparisons Fifth-Grade Proportions of Books Selected after Presentations 139

40. Scheffe Test for Media Comparisons Fourth-Grade Proportions of Books Selected after Testing . 140

41. z-Tests Comparing Book Selections Elicited by Each Medium with Baseline Proportion 142

42. Means of All Ss' Individual Ratio Scores toward the Four Presentation Modes 147

43. Analysis of Variance Individual Ratio Scores toward the Four Presentation Modes 148

44. Chi-square Test Comparing Distribution of Number of High Scores toward the Four Media with Expected Equal Distribution 149

Table Page

45. Chi-square Test Comparing Distribution of Number of Low Scores toward the Four Media with Expected Equal Distribution 149

46. Class Raw Scores for Fourth-Grade Classes for the Four Word Slides 154

SUMMARY

Introduction. Three important problems in the field of instructional technology remain unsolved: (1) What is the contribution of media to the educational process? (2) What instructional objectives are media best suited to meet? (3) What are the different effects of different media? The affective domain, which has been largely ignored by research, provided this study with the perspective from which to view, and attempt to solve, these problems.

Problems. The specific problems of this exploratory study were: (1) to compare the effectiveness of mediated and non-mediated instructional methods in eliciting key affective responses, (2) to begin to develop a taxonomy of media based on the degree of affective response each medium is capable of eliciting, (3) to validate a particular measure of affective response, (4) to test the appropriateness of a particular design for affective domain research.

Methodology. The affective response variables selected were interest, "satisfaction in response," and action, "preference for a value." A physiological measure, capillary pulse pressure, was selected as a measure of interest; voluntary selections of books was selected as a measure of action.

Four films on United States geography formed the basis of the study. They were transformed into two other mediated forms, slides and tapes, and into one non-mediated form, teacher presentation. Test slides, also taken from the films, elicited reactions to both the subject matter and the media themselves.

Subjects (_S_) were fourth- and fifth-grade students. Within intact classes, _S_ received four five-minute presentations, one by each method being tested, with each being on a different subject matter. _S_ were then given the opportunity to select a book on one of the four subject matters. Finally, _S_ were taken to the test room and pulse pressure measures were obtained.

Pulse pressure scores were converted to ratios and differences relative to control slides; in addition, numerical scores were converted to nominal data which were analyzed as proportions.

Results and Conclusions. (1) There were no media effects on "satisfaction in response" toward the subject matter, but no conclusion can be drawn because the insensitivity of pulse pressure and the time of testing obscured any results. (2) There were media effects on "preference for a value" toward the subject matter, with film eliciting more responses than any one of, or all of, the other presentation modes, and being the only mode which, when compared with preexperimental responses, was effective in eliciting action. (3) There was a difference in scores on "satisfaction in response" toward media, with the hierarchy of scores being F>S>TCH>T and with film being the only mode that elicited positive interest in itself as a medium. (4) The only taxonomy of media based on affective response that could be derived from this study was:

FILM-------------------------Preference for a value.

SLIDES, TEACHER, TAPE---Some level below Preference.

(5) Capillary pulse pressure not valid as a measure of "satisfaction in response" when measured after the presentation of the stimuli; due to the extreme affect needed to influence it, it must be measured during the presentation. (6) Due to the nature of pulse pressure sensitivity (see 5), a modification of the Balanced Latin Square Design, with testing after all treatments, was not a valid design for affective domain research when pulse pressure was used as a measure; it was a valid design, however, for measuring "preference for a value."

Implications. The results and conclusions summarized above have implications for four important areas: (1) instructional technology, (2) the affective domain, (3) educational in general, and (4) future research. These implications were discussed at length.

CHAPTER I

PROBLEM

Part of the process of problem solving involves the use of three principles: (1) view the problem from a different perspective; (2) relate the problem to an analogous problem; and (3) imagine a more general or a more specific problem (Polya, 1957). This study is an attempt to apply these principles to several problems in the field of instructional technology.

Problems in Instructional Technology

Contribution

Instructional technologists claim that media[1] can make a significant contribution to the educational process, but, at present, no one can state precisely what this contribution of media is.

---

[1] NOTE: As used in this study, the term "media" is defined as it was by the DAVI Commission on Definition and Terminology (Ely, 1963) with the addition of a qualification by Carpenter (Carpenter and McLuhan, 1960):

"Media-instrumentation indicates the transmission systems--the materials and devices--available to carry the selected messages . . . the information, content, or meaning to be transmitted" (Ely, 1963:20). However, "each [medium] codifies reality differently and thus influences, to a surprising degree, the content of the message communicated [and its effect on the receiver of the message]" (Carpenter, 1960:176).

The classic argument regarding the contribution of media seems to be that media facilitate improved communication and learning in the classroom. This view has been expressed in several recent publications:

> . . . Educational media are both tools for learning and avenues for learning, and their function is to serve these two processes by enhancing clarity in communication. . . . (Morris, 1963:11)
>
> . . . It [mass communication] has provided educators with new tools which can improve teaching and increase learning. (Educational Policies Commission, 1958:2)

This view has also been expressed, albeit implicitly, by the research that has been carried out in the media field--research which consists mainly of studies comparing the effectiveness of different media and "conventional instruction" in teaching information or motor skills (cf. reviews of research by Allen, 1960; American Educational Research Association, 1962, 1968; Hoban and van Ormer, 1950; Lumsdaine, 1963; Reid and MacLennan, 1967; Schramm, 1964; and Smith and Smith, 1966).

Unfortunately, from the point of view of the instructional technologist, this research does not, in general, support the claim that media improve learning (cf. reviews of research cited above). This situation leaves the instructional technologist hard pressed to state precisely what the contribution of media is.

Recently, instructional technologists have backed away from the sweeping claims discussed above and have taken the more sophisticated position which is discussed next.

Instructional Objectives

Instructional technologists claim that media can best bring about certain specific instructional objectives, but at present, no one knows what kinds of instructional objectives media are best in bringing about.

Briggs, Campeau, Gagne, and May (1967) have made the most sophisticated attempt so far to match media to instructional objectives. Their concern is with the external events of instruction, those stimuli which prompt or reinforce a response. The procedure they have developed for identifying the appropriate stimuli is as follows:

I. Behavioral Objectives
    A. State behaviorally (according to Mager, 1962)
    B. Sequence in psychological order
II. Type of Learning
    A. Identify type of learning for each objective (according to Gagne, 1965)
III. Media Program
    A. Type of learning for each objective
    B. Identify external conditions of learning, or instructional events, for that type of learning
    C. Identify content to be dealt with for each objective

   - D. Ask how to provide external conditions for type of learning and subject matter
   - E. Ask what stimulus forms, including media, could be used to provide the external conditions

IV. Media Options

   - A. Identify best medium for a reasonably sized unit of instruction

V. Media Selection

   - A. Decide on type of instruction desired: group, individual, automated, teacher controlled
   - B. Assign media in terms of trade-off between objectives and convenience and economy.

This procedure represents an advance over the "use media to improve learning" approach because it attempts to match media to specific types of learning. It does not, however, really do this scientifically, since the media program, options, and selection are still done on the basis of intuition and/or experience. Thus, the instructional technologist cannot say with confidence which objectives media are most helpful in meeting.

The procedure discussed above does suggest a still more sophisticated approach, an approach that recognizes not only differences between media and non-media, but also differences between different media.

Taxonomy

Instructional technologists claim that different media have different effects and therefore best meet different instructional objectives, BUT, at present, no one knows what the differences in media effects are.

"An urgent need exists," according to Saettler (1968:119), "for a taxonomy of instructional media which can provide a systematic approach to the selection and use of media for educational purposes." Such a taxonomy was called for in 1949 in the NSSE Yearbook AV Materials of Instruction, but so little has been done in this area that almost twenty years later Saettler, as well as Allen (1967), Briggs, et al (1967), and Meredith (1965), had to again stress the need for a taxonomy.

McLuhan (1965) has discussed the effects of the mass media on society in general, but has made no attempt to relate the media to instructional objectives. Allen (1967) has proposed a tentative taxonomy of media in art education, but it is not general enough to clearly differentiate media effects. Thus, the instructional technologist cannot state what the differences in media, or the differences in the instructional objectives for which they are best suited, are.

Summary

Three problems in the field of instructional technology remain unsolved: (1) what is the contribution of media to the educational process; (2) what instructional objectives are media best suited to meet; (3) what are the different effects of different media in terms of the instructional objectives they are best suited to meet.

Analysis

By applying Polya's problem solving principles to the unsolved problems in instructional technology, two conclusions were reached: (1) perhaps the previous research concerned with these problems had taken too narrow an approach in its attempts to find solutions; and (2) perhaps looking at the problems from a different perspective or in a more general manner might be more fruitful.

One of the new perspectives that suggested itself was to analyze the dependent variables used as the criteria for comparison in the previous research. While it was clear that the dependent variable was learning in almost all studies, an examination of the type of learning studied led to interesting findings.

The type of learning was analyzed in the context of the classification proposed by Bloom (1956) and Krathwohl (1964), who have divided learning into three domains: cognitive, or information learning; psychomotor, or skill learning; affective, or emotional and attitudinal learning. A comparison of the number of studies concerned with the effects of media on cognitive learning and on affective learning was performed; it was based on the number of studies cited in the two major collections of research summaries (Hoban and van Ormer, 1950, and Reid and MacLennan, 1967), which cover the years 1918 to 1965. The results are presented in Table 1.

TABLE 1

The number of studies dealing with the effects of instructional media on cognitive learning and on affective learning as indicated by the number of studies cited in two major collections of research summaries

	Cognitive learning	Affective learning
Hoban and van Ormer; 1918-1950	12	5
Reid and MacLennan; 1951-1965	199	83

Media and the Affective Domain

This comparison indicates that the previous research was indeed too narrow in its approach. It placed most of its emphasis on cognitive learning and virtually *ignored affective learning*. The lack of concern with the affective domain is especially significant in the light of McDonald's (1961) contention that the *primary function of media* is in the *affective* domain. Deese (in the same volume, 1961:87) summarizes McDonald's argument:

> McDonald reminds us not to neglect the *motivational* properties of audiovisual devices. This, indeed, may be *their specific function*. *Even when it cannot be demonstrated that they directly produce learning which is*

> *better*, or more efficient, or more productive of understanding than learning by ordinary classroom procedures, they *still may have an advantage in motivating interest* and in providing something like stimulus predifferentiation. (Italics mine.)

It is the problem of this study to experimentally test this hypothesized relationship between media and motivation.

Problems in the Affective Domain

"We know much less about teaching motivations and attitudes than about teaching factual knowledge," according to Neal Miller (1957:64). Since this study is concerned with the affective domain, then, there are several additional problems that it must take into account and try to solve.

Lack of Concern

Krathwohl (1964) indicates that the affective domain has been largely ignored by researchers in the field of educational psychology, and this can be extended, as was seen above, to include researchers in the field of instructional technology. He suggests that the lack of research in, and concern with, affective learning is caused by several factors: (1) the general view that affect is a private, and not a public matter; (2) the idea that affective responses or characteristics tend to develop relatively slowly; (3) the belief that if cognitive learning takes place, there will automatically be a corresponding development of the appropriate affective behaviors; (4) the existence of ambiguity in most affective teaching objectives; (5) the difficulty that exists in attempting to evaluate affective learning (15-23).

The first four factors seem to be more related to general environmental factors than to experimental factors, and it is beyond the scope of this study to attempt to change those prevailing attitudes. However, Edling's (1968) conclusion that "measurement problems appear to be more complex in the affective domain" (187) must be dealt with.

Measurement

Measurement problems in the affective domain fall into two classes: (1) measurement devices and (2) experimental designs.

Devices.--It is a generally accepted conclusion that the best measurement of the existence of an attitude is the observation of the student's actions in a relatively free atmosphere (Edwards, 1957). However, due to the financial and time constraints placed on the experimenter or teacher, this is usually impossible. As a result, paper and pencil methods for measuring attitudes indirectly have been developed by Thurstone and Chave (1929), Likert (1932), Guttman (1950), and Osgood, *et al*. (1957).

Miller (1957), however, emphasizes "the dangers of indirect measures of motivation" (71). He points out that "too many studies of attitude change, which are otherwise technically slick, have used paper-and-pencil, or polling-type tests which have not been validated" (71). New and better measures of motivation must, therefore, be developed and tested. One new measure, a physiological one, involving the measurement of capillary pulse pressure, has recently been tested and validated by Bergum, _et al_. (1966a-e, 1967). Capillary pulse pressure must be tested again in different situations to see if it is a reliable and valid measure of attitude.

Designs.--It is a generally accepted fact that the experimental situation itself has an effect on the dependent variables. This is known in the physical sciences as the "Heisenberg effect," which states that

> . . . the interaction between observer and object causes uncontrollable and large changes in the system being observed. . . . the uncontrollable perturbation of the observed system alters the values of previously determined quantities . . . (Heisenberg, 1951:555).

In the social sciences this takes the form of experimental _motivation_. While this form of motivation does have an effect on cognitive variables, it seems that its effect on other motivational variables would be immense. Thus, for research in the affective domain, an experimental design is needed which will reduce as much as possible the _experimental_ motivation.

There are other design problems too. In the area of testing, for example, Edling (1963) found that while in the cognitive domain pretesting enhanced post-test scores, in the affective domain pretesting depressed post-test scores. This finding indicates that many of the procedures we take for granted in research in the cognitive domain will have to be tested and revised for research in the affective domain.

Analysis

Much research is needed in the area of techniques to be used in work with the affective domain. Miller summarizes the need in this way:

> If reliable techniques [both devices and designs] for measuring motivational effects can be perfected, we can use them to compare the effects of various procedures and to discover more about the laws of motivating people. (1957:72)

Thus, in addition to the problem of testing the relationship of media and motivation, this study also has as its problem to test techniques, both a device and a design, for their utility in affective domain research.

Problem of This Study

The problems of this small-scale, exploratory study were:

1. To compare the effectiveness of one nonmediated (teacher) and three mediated (film, slides, tape) instructional methods in eliciting two key affective, or attitudinal responses, interest (satisfaction in response) and action (preference for a value).

2. To develop a taxonomy of media based on the degree

of affective response each medium is capable of eliciting.

3. To validate capillary pulse pressure as a measure of interest, and to validate appropriate means of analyzing the pulse pressure data.

4. To test the appropriateness of the balanced latin square design with testing after all treatments for affective domain research.

Definitions

For the purposes of this study, the following terms are defined operationally as indicated next to each term.

Cognitive Learning

Cognitive learning involves learning

> objectives which emphasize remembering or reproducing something which has presumably been learned, as well as objectives which emphasize the solving of some intellective task for which the individual has to determine the essential problem and then reorder given material or combine it with ideas, methods, or procedures previously learned. (Krathwohl, 1964:6)

Psychomotor Learning

Psychomotor learning involves "objectives which emphasize some muscular or motor skill, some manipulation of material or objects, or some act which requires a neuromuscular co-ordination" (Krathwohl, 1964:7).

Affective Learning

Affective learning involves "objectives which emphasize a feeling tone, an emotion, or a degree of acceptance or rejection . . . [and which are usually] expressed as interests, attitudes, appreciations, values, and emotional sets or biases" (Krathwohl, 1964:7).

Controlled or Selected Attention

"The differentiation of aspects of a stimulus which is . . . selected and attended to despite competing and distracting stimuli" (Krathwohl, 1964:178). This is level 1.3 of Krathwohl's taxonomy.

Satisfaction in Response

"The behavior is accompanied by a feeling of satisfaction, an emotional response, generally of pleasure, zest, or enjoyment" (Krathwohl, 1964:179). This is level 2.3 of Krathwohl's taxonomy. It is used in this study to refer to affective "interest" responses. It is measured in this study by capillary pulse pressure.

Capillary Pulse Pressure

Pulse pressure is determined by a transducer (similar to a microphone) attached to the finger, which measures changes in blood pressure as a function of the constriction and dilation of the capillaries. It has been validated as a measure of emotional arousal and approach tendencies by Bergum and Lehr (1966a-e, 1967).

Preference for a Value

"The individual is sufficiently committed to the value to pursue it, to seek it out, to want it" (Krathwohl, 1964:181). This is level 3.2 of Krathwohl's taxonomy. It is used in this study to refer to affective "action" responses. It is measured in this study by voluntary book selection responses.

Subject Matter

Subject matter, as used in this study, refers to the "Geography of the United States." Specifically, it refers to the four areas used as stimulus material: The Great Plains (abbreviated "p"); The Gulf Coast ("c"); The Middle Atlantic Seaboard ("m"); The Rocky Mountains ("r").

Mediated Instruction

Mediated instruction, as used in this study, refers to instruction which is totally or primarily presented by packaged instructional media and not by the classroom teacher. Three types of mediated instruction were used in this study: sound film (abbreviated "F"); audio tape ("T"); 35mm slides, with some commentary by the teacher ("S").

Nonmediated Instruction

Nonmediated instruction, as used in this study, refers to instruction which is totally or primarily presented by the teacher; in other words, it is teacher instruction.

Assumptions

Two methodological assumptions are being made in this study:

Assumption One

Capillary pulse pressure will (a) be a valid measure of "satisfaction in response" and (b) yield the same results when analyzed by several different methods.

Assumption Two

The balanced latin square design with testing after all treatments will be a valid design for affective domain research.

Hypotheses

Hypothesis One

Pulse pressure scores will indicate that preexperimental "satisfaction in response," or interest responses, toward the four subject matters were (a) equal and (b) neutral.

Hypothesis Two

Voluntary book selection scores will indicate that preexperimental "preference for a value," or action responses, toward the four subject matters were (a) equal and (b) zero.

Hypothesis Three

Pulse pressure scores will indicate that "satisfaction in response" toward the four subject matters was not affected by (a) classes, (b) subject matter, or (c) order of presentation.

Hypothesis Four

Pulse pressure scores will indicate that "satisfaction in response" toward the four subject matters was affected (a) by media, (b) in a hierarchy: F>S>T>TCH.

Hypothesis Five

Book selection scores will indicate that "preference for a value" toward the four subject matters was not affected by (a) classes, (b) subject matter, or (c) order of presentation.

Hypothesis Six

Book selection scores will indicate that "preference for a value" toward the four subject matters was affected (a) by media, (b) in a hierarchy: F>>S=T>>TCH.

Hypothesis Seven

Pulse pressure scores will indicate that "satisfaction in response," or interest responses, toward the four media form a hierarchy: F>S=T>TCH.

Taxonomy

Based on the assumptions and the hypotheses, it is expected that the results of the study will support the following conclusion:

The four media tested can be arranged in a taxonomy based on the highest level of affective response each medium was capable of eliciting:

FILM	Preference for a Value (3.2)
SLIDES . . . TAPE	Satisfaction in Response (2.3)
TEACHER . .	Some level below Satisfaction in Response.

Delimitations

Due to the nature and size of this study, each of the variables indicated below was limited as indicated next to that variable.

Affective Responses

The only affective responses studied in this experiment were "satisfaction in response," interest, and "preference for a value," action.

Measurements

The only measurements of affective responses used in this experiment were capillary pulse pressure for "satisfaction in response," and voluntary book selections for "preference for a value."

Subject Matter

The only subject matter used as stimulus material in this experiment was the geography of four regions of the United States: Great Plains, Gulf Coast, Middle Atlantic Seaboard, and Rocky Mountains.

Media

The only media used to present the stimulus material in this experiment were: sound film, audio tape, and 35mm slides.

Nonmedia

The only nonmediated instructional method used in this study was the teacher talking.

Timing

The amount of time for each of the four presentations to each class was five minutes, out of a total time of fifteen minutes for each presentation. The testing took place only after all four presentations have been completed.

Subjects

The only subjects used in this experiment were all the fourth- and fifth-grade students in one elementary school in one school district near Los Angeles, California.

Organization

Chapter II will present a review of the literature, including definitions of the concept of attitude, research and theory related to the importance of the affective domain, and research and theory concerned with the relationship between instructional media and affective learning.

Chapter III will present the procedure used in this study, including subjects used, materials used, dependent variables selected, instrumentation used, design used, specific procedures followed, and statistical analyses used.

Chapter IV will present the results of the experiment and a brief discussion of the results.

Chapter V will present the implications of the study, including a summary, the conclusions, the author's interpretation of the findings, and suggestions for further research.

CHAPTER II

REVIEW OF THE LITERATURE

The objective of this review of the literature is threefold: (1) to show the generality and complexity of affect or attitude; (2) to show the importance of the affective domain; (3) to show the relationship that has already been established between the affective domain and instructional media.

To meet the first objective, three attempts at defining the concepts of attitude and affect were reviewed. To meet the second objective, several conclusions were drawn from the definitions of attitude, and several theories emphasizing the importance of affective learning were reviewed. To meet the third objective, and possibly the most important one for this study, the research and theory relating affective learning and instructional media were reviewed.

Definitions of Attitude

The complexity of the concept "attitude," and the consequent misunderstanding of what it involved, contributed to the development of the general environmental factors which Krathwohl (1964) cited as mitigating against research in the affective domain.

This does not mean that there have been no attempts to define affective concepts. On the contrary, many constructs, such as attitude, value, interest, appreciation, ideal, motivation, and character traits, have been formulated. The problem is that all of these constructs have been defined rather imprecisely, and, as Remmers (1954) points out, these terms are virtually inseparable in terms of meaning.

Until 1964, the term used most frequently to denote affective responses was "attitude"; its definitions actually referred to all of the alternate terms cited above. The various definitions of attitude that were offered differed considerably in specificity and utility. Two of the most important definitions, which differ considerably in specificity but which indicate, in their own terms, the complexity and the generality of attitudes, are those formulated by social psychologists and learning psychologists.

Social Psychologists' Definition

Sells and Trites (1960) state concisely the definition of attitude that is implied in the Handbook of Social Psychology (Green, 1954):

> [1] a psychological construct, or latent variable,
> [2] inferred from observable responses to stimuli,
> [3] which is assumed to mediate consistency and covariation among these responses. (Sells and Trites, 1960:103)

In expanding each of these three points, both Green and Sells and Trites make several statements which provide some specific parameters of the concept of attitude, and at the same time explain the difficulty of dealing with it.

> [1] . . . attitude is a hypothetical or latent variable, rather than an immediately observable variable. The concept of attitude does not refer to any one specific act or response of an individual, but is an abstraction from a large number of related acts or responses. (Green, 1954:334)

Attitude, then, is a very general construct, but it must be measured indirectly. The difficult measurement procedure involves both the selection of the correct set of responses or acts to observe and the appropriate means of observing them. This difficulty will be referred to again in the review of measurement devices.

> [2] The aspects of responses which define attitudes are the tendencies with respect to learned stimuli . . . [a] to approach or avoid them, [b] to regard them favorably or unfavorably, and [c] to experience pleasant or unpleasant affect associated with them, over a wide range of intensity. (Sells and Trites, 1960:103)

Three dimensions of attitude are suggested by this statement: approach--avoidance; favorable--unfavorable; pleasant--unpleasant. The differentiation of dimensions, or _components_, _of attitude_ is also made by Merrill (1962) and Travers (1963). These authors suggest the same three components using different terminology: (a) _action_, which involves the approach--avoidance dimension; (b) _cognitive_, which involves the favorable--unfavorable dimension; (c) _affective_, which involves the pleasant--unpleasant dimension. This distinction is extremely important to this study, so an example (Merrill, 1962) will be cited.

A "positive attitude" toward superhighways would involve all three components: (a) _action_, referring to the approach toward, or _use_ of, the highways; (b) _cognitive_, referring to _rational, intellectual_ statements favorable to the highways; (c) _affective_, referring to a pleasant "_gut feeling_" about the highways.

This study, then, is concerned with the affective (interest as measured by capillary pulse pressure) and the action (action as measured by book selections) components of attitude, and not with the cognitive component. The difference between these three components will be referred to again later in discussing the selection of relevant studies to review.

> [3] . . . attitudes are important as constructs only when they may be assumed to mediate some consistency and covariation in responses to classes of stimuli. . . . (Sells and Trites, 1960:103)

Since an attitude may cause such a consistent pattern of behavior, it is important to know, in more detail than this definition gives, how it operates in causing the behavior. The definition by learning psychologists gives some explanation.

Learning Psychologists' Definition

Doob (1947, reprinted in Staats and Staats, 1958) approached the definition of attitude from a stimulus-response (S-R) learning theory point of view. He defined it as:

> (1) an implicit response (2) which is both (a) anticipatory and (b) mediating in reference to patterns of overt responses, (3) which is evoked (a) by a variety of stimulus patterns (b) as a result of previous learning or gradients of generalizations or discriminations, (4) which is itself cue- and drive-producing, (5) and which is considered socially significant in the individual's society. (Staats and Staats, 1958:297)

In amplifying some of these points, Doob provides some insight into how attitudes are formed and how they operate to influence behavior.

> [1] Attitude refers to the individual's immediate but *implicit response* to a stimulus pattern and his *consequent tendency to respond still further* as a result of that implicit response. (Staats and Staats, 1958:297) [Italics added.]

This key statement clearly says three things. First, an attitude is initially a response to a stimulus. As a response, it must be *learned*, and "the learning process should be the same as for other responses" (Staats and Staats, 1958:299). Second, it is implicit, and therefore the attitudinal response itself is difficult to measure. Third, the implicit attitudinal response will influence the further behavior of the individual.

> [2] [An attitude is an anticipatory response, that is,] one which originally preceded another rewarded response and which, as a result of being associated with or producing this reward, has been reinforced so that it occurs before its "original time in the response series." (Staats and Staats, 1958:297)

The anticipatory response paradigm indicates that attitudes are learned by association and reinforcement, and that once this association occurs, the attitudinal response occurs well before the normal response to the stimulus. In a sense, then, it mediates between the stimulus and the response. In fact, the attitudinal response may even preclude the normal response, as in the case where a negative attitude removes the individual from the presence of the stimulus, thus eliminating the possibility of making the response.

> [4] Attitudes are said to have stimulus-value, _i.e._, they arouse other responses . . . They may produce a perceiving response . . . [an attitude] also is a drive in the sense that its tension is reduced through subsequent behavior leading to reward. (Staats and Staats, 1958:303)

The cue and drive producing qualities of attitudes explain their "self-fulfilling-prophesy" nature. The attitude alters the individual's perception of the stimuli associated with the attitude. The response he makes to this altered stimulus is reinforced by the reduction of tension associated with the attitude. This reduction of tension, however, also reinforces the perceiving responses, and they tend to be the same perceiving responses that will be elicited by the stimulus the next time it appears. Thus, the _attitude creates a closed system_, where the attitude influences not only the response but the stimulus as well.

The implication of this closed system concept is that _attitudes are extremely difficult to change_, and it is very important that the _desired attitude be the first one learned_.

Analysis

Both the social psychologists' and the learning psychologists' definitions of attitude have been useful in providing a description of the complexity and generality of the concept of attitude: what it is, how difficult it is to measure, what its components are, how it is learned, what a broad range of behavior it influences, and how it influences behavior.

The description is weak, though, in the area of the influence of attitudes on behavior. It also omits the problem of terminology, and does not distinguish between attitudes and interests, values, appreciations, and ideals. The solutions to both of these weaknesses would be found if there were a definition which included the concept of the degree of attitude, or intensity. Intensity would indicate the degree to which the attitude controlled behavior, and would provide a means for differentiating among the many terms now used indiscriminately.

An attempt has been made to deal with affective responses in terms of their intensity, to order them in terms of their control over behavior.

Taxonomy of Educational Objectives, Affective Domain

This attempt has been made by Krathwohl, Bloom, and Masia (1964) in the *Taxonomy of Educational Objectives, Handbook II: Affective Domain*.

Using "Internalization" as a measure of degree (intensity), or organizing principle, they formed an affective continuum:

> (1) the individual is merely aware of a phenomenon, being able to perceive it.
> (2) ..... he is willing to attend to phenomena.
> (3) ..... he responds to the phenomenon with a positive feeling.
> (4) ..... he may feel strongly enough to go out of his way to respond.
> (5) ..... he conceptualizes his behavior and feelings and organizes these conceptualizations into a structure.
> (6) ..... structure grows in complexity as it becomes his life outlook. (Krathwohl, 1964:27)

What follows is a brief outline of the categories of affective responses according to the Taxonomy, and a simplified definition of each category.

1.0 RECEIVING (ATTENDING)--learner is sensitized to the existence of certain phenomena and stimuli.
    1.1 Awareness--learner will merely be conscious of something.
    1.2 Willingness to Receive--the learner is not actively seeking to avoid it; he tolerates it.
    1.3 Controlled or Selected Attention--differentiation of aspects of a stimulus which is . . . selected and attended to despite competing and distracting stimuli.
2.0 RESPONDING--the student is committing himself in some small measure to the phenomena involved . . . he is doing something with or about the phenomenon.
    2.1 Acquiescence in Responding--compliance . . . passiveness so far as the initiation of the behavior is concerned.
    2.2 Willingness to Respond--capacity for voluntary activity.
    2.3 Satisfaction in Response--the behavior is accompanied by a feeling of satisfaction, an emotional response, generally of pleasure.
3.0 VALUING--that a thing, phenomenon, or behavior has worth; behavior . . . is motivated . . . by the individual's commitment to the underlying value guiding the behavior.
    3.1 Acceptance of a Value--the emotional acceptance of a proposition or doctrine upon what one

implicity considers adequate ground.
    - 3.2 Preference for a Value--the individual is sufficiently committed to the value to pursue it, to seek it out, to want it.
    - 3.3 Commitment--he acts to further the thing valued in some way . . . to deepen his involvement with it and with the things representing it.
- 4.0 ORGANIZATION--the beginnings of organizing more than one relevant value into a value system.
    - 4.1 Conceptualization of a Value--the quality of abstraction . . . see how the value relates to those that he already holds.
    - 4.2 Organization of a Value System--bring together a complex of values into an ordered relationship that is harmonious and internally consistent.
- 5.0 CHARACTERIZATION BY A VALUE OR VALUE COMPLEX--individual acts consistently in accordance with the internalized values.
    - 5.1 Generalized Set--a persistent and consistent response to a family of related situations or objects . . . a predisposition to act.
    - 5.2 Characterization--a value system having as its object the whole of what is known or knowable . . . a philosophy of life. (Krathwohl, 1964: 176-185)

While it is far from flawless, and it is to be looked on only as a first step in the categorization process, the Taxonomy does remedy many of the problems found in previous definitions.

With regard to intensity of the affective response, a dimension lacking in the definitions cited earlier, the Taxonomy indicates an increasing intensity of response as the response becomes higher in the continuum; thus, the intensity of the Receiving response is very low, while that of the Characterization response is very high.

Control of behavior also increases as the affective response moves higher in the continuum; at the Awareness level there is almost no control of behavior at all, while at the Characterization level behavior is almost completely controlled.

Another area in which the Taxonomy remedies problems is that of terminology. By comparing the common meanings of the often confused terms with the definitions of the Taxonomy's categories, it is possible to place these terms in a somewhat rough order along the affective continuum. It is also possible to place the three components of an "attitudinal response" along the continuum in terms of which component is prevalent for each level of affective response (see Figure 1).

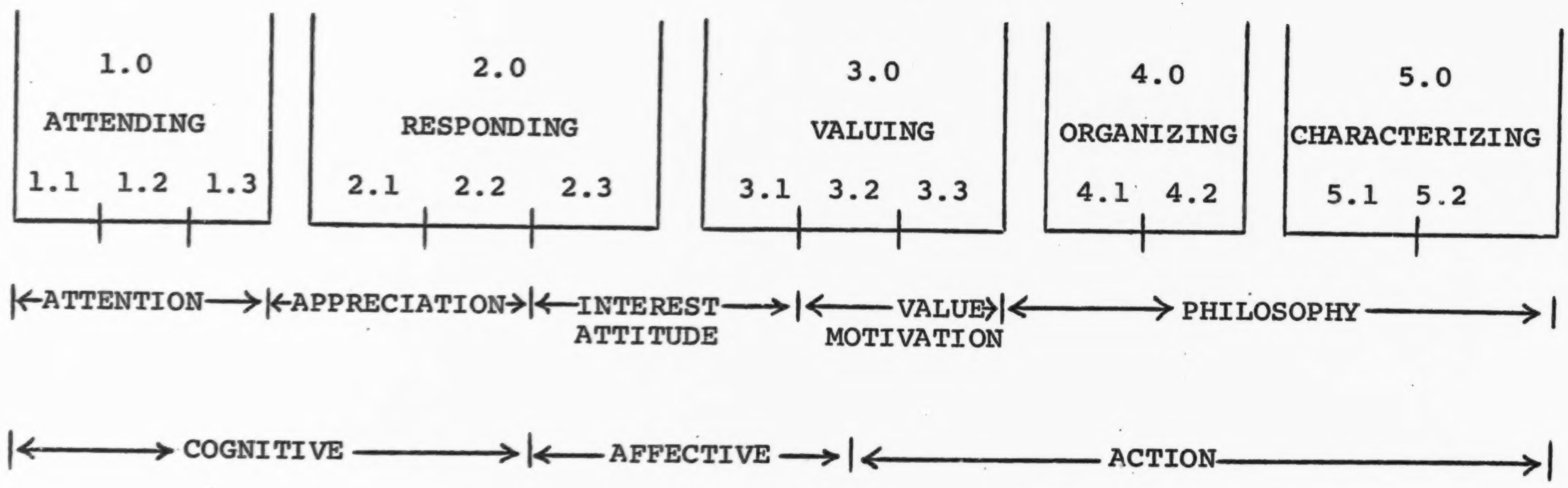
While this ordering of terms and components along the Taxonomy's continuum (adapted from Krathwohl, 1964:37) does not yield a one-to-one relationship, it does provide an understandable way of defining the common terms as well as a useful transformation between the two systems of nomenclature.

With the Taxonomy's addition of a standard set of terminology, and of the concepts of intensity and behavior control, to the previously presented characteristics of "attitude"--characteristics such as what it is, what its components are, and how it is learned, enough background has been built to proceed to a review of the literature concerned with the importance of affective learning.

Importance of the Affective Domain

The belief that attitudes were not of first-rate

Fig. 1.--A Comparison of Common "Attitudinal" Terms and Attitudinal Components with Terminology from Krathwohl's (1964) *Taxonomy*


1.0
ATTENDING
1.1
1.2
1.3
2.0
RESPONDING
2.1
2.2
2.3
3.0
VALUING
3.1
3.2
3.3
4.0
ORGANIZING
4.1
4.2
5.0
CHARACTERIZING
5.1
5.2
ATTENTION
APPRECIATION
INTEREST
ATTITUDE
VALUE
MOTIVATION
PHILOSOPHY
COGNITIVE
AFFECTIVE
ACTION

importance, that attitudes would develop by themselves as other learning took place, contributed to the development of the general environmental factors which Krathwohl (1964) cited as mitigating against research in the affective domain. This belief is gradually disappearing as both definitions of attitude and theories of learning are beginning to emphasize the importance of attitudes and affective learning.

Conclusions from Definitions

Five conclusions regarding the importance of attitudes can be drawn from the definitions discussed above.

Learning.--Attitudes are easily learned by association and reinforcement.

Intensity and Control.--Attitudes may have different levels of intensity, and the greater the intensity of the attitude, the greater the amount of control it exerts over behavior.

Generality.--An attitude is associated not with just one stimulus and response, but with a wide range of related stimuli and responses.

Mediation.--An attitude mediates between the stimulus and the response, and, in some cases, may even preclude the making of the normal response to the stimulus.

Cue-Production.--An attitude alters the way the stimulus is perceived, thus creating a closed system which makes the attitude extremely difficult to change.

The generality and degree of influence of attitudes, then, makes it essential that they be considered in any situation, and especially in a learning situation. Some recent theories also support the latter part of this conclusion.

Theories Involving Affective Learning

Recently, theoretical formulations in learning psychology, social psychology, education, and mass media have begun to take into account the important role affect plays in a learning situation; some theorists have even based their entire theories on the role of affect. The theories cited and discussed below emphasize the scope of the effect of affective responses in learning situations.

Mowrer's Revised Two-Factor Learning Theory.--O. H. Mowrer (1954, 1956, 1960a, 1960b) has based his comprehensive theory of learning entirely on the classical conditioning of affective or emotional responses:

> Learning, I propose, is not a matter of strengthening or weakening connections between drives and overt behavior, but of the acquisition of "positive" (rewarding) and "negative" (punishing) feedback from stimuli that have accompanied past action or experience. (Mowrer, 1954: 84)

> . . . all learning is in the nature of sign learning, significance learning, meaning learning. When a stimulus (external or internal) is repeatedly paired, or correlated, with a bad experience, *i.e.*, with drive incre-

> ment, a meaning (fear) is learned which tends to prevent recurrence of that experience. On the other hand, when a stimulus (external or internal) is repeatedly paired with a good experience, i.e., with drive decrement, a meaning (fear decrement or hope) is learned which tends to insure recurrence of that experience. (Mowrer, 1956:121)
>
> Learning thus alters what the individual wants and wants to do (and does) but not what he can do. (Mowrer, 1960a:220)
>
> Meanings, not means, attitudes, not actions--these are most immediate outcomes of learning. . . . (Mowrer, 1956:85)

Thus, the student learns one of two affective responses--"hope" or "fear"--to stimuli and situations, and these two affective responses guide all his instrumental responses--cognitive or psychomotor.

The implications of this theory in a learning situation are spelled out by Bugelski (1964). The student in a learning situation is what he calls "emotionable"; he may be interested and excited, or bored; he may develop positive or negative emotional (affective) responses toward the content to be learned. The presenter of this content, whether it is a live teacher or some form of media, is the primary stimulus object. As such, the presenter is the one who arouses the emotional responses in the student--he is the unconditioned stimulus for emotion. The subject matter he teaches will become the conditioned stimulus for emotion, eliciting either "hope," and a consequent approach response, or "fear," and a consequent avoidance response. "The job of the teacher," Bugelski concludes, "is to arouse emotional reactions of feeling 'good' (hope) in connection with the content he is attempting to teach. . . . The teacher does not 'instruct.' The student learns because he 'feels good'" (Bugelski, 1964:122).

Amosov, et al., Computer Model of Human Intellectual and Emotional Functioning.--

> The model consists of the following components: input, interaction, emotions, output, analysis, short-term memory, long-term memory. The model (1) analyzes each *input word into* its intellectual and *emotional components*, (2) searches the memory bank for similar past experiences, then (3) constructs an *emotional state based on* (a) the preceding emotional state of the model, (b) the emotional background supplied from without, (c) the *emotional tone of the situation*, (d) the *emotional tone of analogous situations in the past*, and (e) the emotional tone of the preceding output of the model. This emotional state then (4) determines how the input material will be evaluated emotionally. (Abstract from *Psychological Abstracts*, #9[5], 1350) [Italics added.]

This model makes two points that directly bear upon the importance of affective learning and how it occurs. First, it emphasizes that there is an affective component in all input. No matter how cognitive or intellectual the subject matter may seem, there is an affective component to some aspect of it which the student perceives and acts upon. Again, then, to the presenter of the subject matter falls the task of trying to make that affective component a positive one.

Second, the model emphasizes the distinction between the effects of emotional tones of *past* situations on the emotional state and the effects of emotional tones of the *present* situation on the emotional state. This distinction has several implications.

The addition of present emotional tones to past ones allows the student to continually evaluate his emotional state toward the subject matter, and, if he finds a discrepancy between present and past tones, to change the emotional state toward the subject matter. It is not enough, therefore, for the initial presentation of the subject matter to create a positive emotional tone and for the presenter to assume that this positive tone will hold up throughout the course; each additional presentation of the subject matter must also create a positive tone to reinforce the existing positive emotional state.

Bruner's Affective Categories and Interest in Learning.--Jerome Bruner discusses the importance of the affective domain in two different contexts.

In *A Study of Thinking* (Bruner, 1956), he is concerned with categorization, which depends "upon the acceptance of certain properties of objects as being criterial or relevant . . . and others being irrelevant. One may distinguish," Bruner claims, "three broad classes of equivalence categories, each distinguished by the kind of defining response involved" (p. 4).

The first category he identifies is the *affective* category. "Certain forms of grouping appear to depend very heavily upon whether or not things placed in the same class evoke a common affective response" (p. 4). What causes these people, objects, or experiences to be "grouped together as 'alike,' the 'same kind of thing,'" Bruner concludes, "is the evocation of a defining affective response" (p. 4).

Since people often make responses to a stimulus not on the basis of its specific characteristics but on the basis of its class membership and class properties, it is important, in order to get an approach response to an educational stimulus, that the stimulus be in an affective class defined by positive emotional responses.

Bruner (1960) makes this point more explicit in The Process of Education, where one of his recommendations is "increasing inherent interest of the materials taught" (p. 73). What is necessary to "get children more involved in the process of learning" is to develop "in the child an interest in what he is learning, and with it an appropriate set of attitudes and values about intellectual activity generally" (p. 73).

Gagné's Conditions of Learning.--Gagné (1965) discusses the affective domain in terms of many types of "motivation," and identifies one type of motivation relevant to the thesis: "Motivation to engage in learning."

Gagné conceives of the first step in the instructional process as the student's placing himself, mentally as well as physically, "in the environment where such instruction occurs in order to be able to be affected by it" (p. 208). Physical placement refers to the motivation to attend school, and will not be discussed here, but mental placement refers to what the student's mind does while he is in the classroom, and is quite important to this discussion. "If a student is to respond to stimulation," says Gagné, "he must have a state of alertness that corresponds at least in one sense to the commonsense word 'attention'" (p. 209). Bugelski (1964) also makes this point when he emphasizes that the "stimulus must be received to be effective" (p. 123). Gagné believes that this state of alertness or attention can be brought about through what he calls "signal learning," which is similar to Pavlov's classical conditioning and Mowrer's "sign learning."

Krathwohl's Taxonomy of Educational Objectives, Affective Domain.--Krathwohl (1964) cites two relationships between the cognitive and affective domains: (1) "we use changes in the cognitive domain as a means to make changes in the affective" and (2) "we use an affective goal as a means to achieve a cognitive one" (p. 54). While the former relationship tends to be the preferred orientation, Krathwohl believes that the second is at least as important. In describing the second relationship more fully, he says:

> . . . One of the main kinds of affective domain objectives which are sought as a means to cognitive ends is the development of interest or motivation. As viewed from the cognitive pole, the student may be treated as an analytic machine, a "computer" that solves problems.

> In contrast, viewed from the affective pole, we take greater cognizance of the motivation, drives, and emotions that are the factors bringing about achievement of cognitive behavior.
>
> Obviously *motivation is critical to learning* and thus one of the major ways in which the *affective domain is used as a means to the cognitive*. . . . The large number of interest objectives indicates the importance of this aspect of the learning situation. The influence of hedonic tone on memory and learning is also important: *children are more likely to learn and remember material for which they have a positive feeling*. (p. 57) [Italics added.]

The implication of Krathwohl's statement is that when affective learning is used as a means to cognitive learning, affective learning is actually a *prerequisite* to cognitive learning. The interest, motivation, and emotions must be there before cognitive learning can take place. "For only as one is willing to attend to a phenomenon will he learn about it," Krathwohl (1964:50) concludes.

Summary

The definitions of attitudes have indicated that they are very generalized in nature and that they have a considerable influence on behavior. Krathwohl's *Taxonomy* has presented a view of the extensive range of what constitutes affective responses: receiving, responding, valuing, organizing, and characterizing. Mowrer's theory of learning states that all learning is based on the learning of two affective responses: hope and fear. Amosov, *et al*.'s model indicates that all input to an individual has emotional components, and stresses the importance of the emotional component in the selection of responses. Bruner distinguishes three different means of categorization, the most basic of which is based on affective properties, and stresses the necessity of interesting the child in what he is learning. Gagné notes the importance of motivation in influencing the student's mental placement in a learning situation. Krathwohl maintains that affective learning is a prerequisite to cognitive learning.

Conclusions

Based on these statements, it is safe to conclude that the affective domain is important, and is especially important in a learning situation like school.

It is also safe to conclude that in school it is essential that the affective learning that takes place be the learning of positive affective responses--of hope responses, of interest responses, of approach responses.

It follows directly from this conclusion that any tools that are available in the classroom to elicit these positive affective responses, to motivate students, should be used extensively. Further, considering the importance of positive affective responses, it follows that the tools used should be the most effective ones available.

McDonald (1961, cited in Chapter I) maintains that instructional media serve their primary function in the affective domain, that they are extremely effective in motivating interest, in eliciting positive affective responses. The literature relative to this contention is reviewed in the next section.

Instructional Media and Affective Learning

Despite the fact (cited in Chapter I) that their number is far below what can be considered adequate, there are some studies concerned with the effectiveness of instructional media in eliciting positive affective responses. There are also several theoretical statements which bear upon the relationship.

Research

Scope of the Review.--The research concerned with the effectiveness of instructional media in eliciting affective learning actually falls into three different categories, each of which studies a different set of variables. The three different relationships studied are:

1. The change in attitude toward a person, group, idea, event, or place that results from exposing an individual to media designed to change attitudes towards the person, etc.
2. The relationship between attitude toward subject matter (whether caused by mediated or nonmediated means) and the achievement in that subject matter.
3. The attitude toward the subject matter or to a medium that results from using that medium to teach that subject matter.

Initially, it seems that all three relationships are important in determining what the most effective tools to motivate students are. After examination, however, it is apparent that only the third set of studies is relevant, and not the first two.

The reasons for the irrelevancy of the first two categories of studies are discussed below.

(a) Attitude change studies.--This category of studies (studied by Hovland, Lumsdaine, and Sheffield, 1949; Hovland and Weiss, 1951; and Tannenbaum, 1956) may seem, at first, to be the most valuable of the three, since it already possesses a large body of experimental conclusions, and since it seems to be directly concerned with building positive attitudes. The unrelatedness of attitude change studies to the problem, however, is based on (1) the type of media it uses and (2) the component of attitude it changes.

Merrill (1962) distinguishes between two different types of media, "attitude" media and "information" media. Each type has a different objective and a different set of techniques.

Attitude media have as their primary objective the changing of a specific attitude toward, or opinion about, a generally controversial person, group, institution, event, or place. The techniques used in these media include: employing a dramatic plot or characters with which the audience can identify; creating suspense; involving a mood; selecting nonrepresentative portions of the total content;

distorting the content presented; and emphasizing stereotypes. These "attitude" media, which might also be considered propaganda media, are the type used in attitude change research.

Information media, on the other hand, have as their primary objective the presentation of, and teaching of, some cognitive information or some psychomotor skill. Here, the techniques used simply involve employing the sounds, speech, and pictures to give the clearest possible descriptions of, and views of, whatever is being presented. Concern with affective learning, if there is any at all, is of secondary importance and usually takes the form of "attracting attention" and of "being interesting" through the use of several of the capabilities of media, including motion, animation, sound effects, and special effects. These "information" media are the type used in the classroom.

Whether it is right to use "attitude" or propaganda media in the classroom is beyond the point of discussion here. It is a fact, however, that the type of media used in the instructional situation in a classroom is the "information" media. These information media do have an effect on attitude, interest, motivation, even if it is considered secondary by Merrill; this is the effect with which this study is concerned. Thus, the attitude change studies, using "attitude" media, are not relevant to this study.

A second reason for their irrelevancy concerns the component of attitude with which they deal. Merrill concludes from his research that attitude media

> *do not directly change the affective component* of attitude-structure. The initial result of the viewing of . . . [attitude media] is the *manipulation of the cognitive component*. (Merrill, 1962:12) [Italics added.]

The "satisfaction in response" (interest) and "preference for a value" (action) affective responses with which this study is concerned, however, are, according to Krathwohl's *Taxonomy*, related to the *affective and action components* of attitude. Again, then, the attitude change studies, which employ attitude media, are not relevant to this study.

(b) Attitude and Achievement Studies.--The theoretical basis for the attitude-achievement studies is that attitude toward instructional material, mediated or not, should be directly related to achievement in learning that material. If it is not, then the attitude is not important.

When media are involved in these studies, the general interpretation is in terms of the "education--entertainment" controversy: media may be entertaining and create interest, but that has a negative relationship to learning, and education is the real purpose of what occurs in the classroom. Luchins summarizes this classic argument:

> Audiovisual devices are often based primarily on extrinsic rather than intrinsic [to the student] motivation. The teacher may hope that the child will eventually develop an interest in the subject matter or in the learning task *per se*. . . . The pupil so motivated does not come to grips with the subject matter. He may develop a superficial relation to the subject matter in question, and even to learning in general . . . He may

> come to view all learning in terms of its entertainment value. (Luchins, 1961:14)

Flaws abound in this argument. First, it maintains that intrinsic motivation is unqualifiedly better than extrinsic motivation. It does not, however, indicate what to do if this intrinsic motivation is not present (as may be the case in so many of the "culturally disadvantaged" children). The theory that is most relevant to this problem is Skinner's (1961) notion of "shaping." In shaping behavior, the teacher would start out where the student is at present and gradually shape the behavior until it conforms with the desired terminal behavior. Thus, for an unmotivated student, the teacher would *start* out with *extrinsic* motivation and gradually *shape* it to become *intrinsic* motivation. Entertainment, then, can be shaped into education, and they need not represent opposite poles of a dichotomy.

The second flaw in the argument concerns timing. The theory, and the studies based upon it [Ash (1949), Heidgerken (1948), Twyford (1951), Vander Meer (1954), Westfall (1934), Neu (1950), Hovland, Lumsdaine, and Sheffield (1949), May and Lumsdaine (1958), Baker and Popham (1965), Brandon (1955), Jorgenson (1955), Vernon (1953), Merrill (1956), Bailey (1947), Becker (1964), Becker, *et al*. (1957, 1958), Davies, Gross, and Short (1958), De Prospo (1958), Macomber, and others (1956, 1957), Seibert (1958), and Strevell (1960)]--these studies are all based on the following paradigm:

Present material ------→ Test <Information
Attitude

They assume that the attitude and the information are learned at the same time. However, Krathwohl and the other theorists cited earlier maintain that the *affective learning is a prerequisite* to the cognitive learning. For this condition to be met, the attitude would have to be learned before the information was presented, as in the following paradigm:

Present material to create attitude -----→ Test attitude -----→ Present material to teach information -----→ Test information

The studies (Tecce and Kapp [1964], Walters and Parke [1964], Krasner, Knowles, and Ullmann [1965], Brodie [1963, 1964], Amster [1964], DeLucia [1963], and Shaevitz [1963]) using this paradigm do indeed show that material toward which there is a positive attitude is learned better than material toward which there is a negative attitude.

Thus, affective learning is a prerequisite to cognitive learning, but will not necessarily occur at the same time as cognitive learning. McDonald and Deese conclude from this that "attempts to assess the motivating properties of any classroom technique *may and should* be examined independently of the criteria of learning" (Deese, 1961:81).

Since this study is following this prescription, is not concerned with initially using extrinsic motivation, and is employing the "prerequisite" instead of the "concomittant" paradigm, then, the attitude-achievement studies are not relevant.

Attitude Studies. Now that the reasons for omitting the attitude-change and attitude-achievement studies from this review have been discussed, the studies concerned with the attitude toward subject matter or to media as a result of using those media will be reviewed. These studies fall in three categories: (1) "satisfaction in response" to media; (2) "satisfaction in response" to subject matter; (3) "preference for a value" toward the subject matter.

1. "Satisfaction in response" to media. Table 2 presents a concise summary of the results of the 69 studies which presented subject matter material to students by mediated methods and then obtained measures of the students' attitudes toward the medium used. In some cases, the attitude scores were rated as positive, neutral, or negative by themselves, and in other cases they were compared to the attitude scores for "conventional instruction" and were rated as better than, equal to, or worse than these scores. Most of the studies used television as the medium, with only six using film and one using slides.

The total number of studies indicating positive or better attitudes is 37. The total number indicating neutral or equal attitudes is 14. The number indicating negative or worse attitudes is 20. A χ^2 analysis was performed on these numbers (see Table 3) to determine if the studies were ran-

TABLE 2

Summary of Studies Concerned with
ATTITUDE TOWARD MEDIA
After Using Media in Instruction

AUTHOR/DATE	MEDIUM	ATTITUDE		
		POSITIVE or Better than what compared to	NEUTRAL or Equal to what compared to	NEGATIVE or Worse than what compared to
Allen, 1956	TV	x		
Bailey, 1947	TV			x
Beatts, 1957	TV	x		
Becker, 1963	TV			x
Becker, *et al*., 1957	TV	x		
Bobren & Siegel, 1960	TV			x
Brandon, 1956	TV		x	
Capraro, 1957	TV	x		

TABLE 2--Continued

AUTHOR/DATE	MEDIUM	ATTITUDE		
		POSITIVE or Better than what compared to	NEUTRAL or Equal to what compared to	NEGATIVE or Worse than what compared to
Carpenter & Greenhill, 1958	TV	x (Behavioral Choice)		
Champa, 1957	TV	x		
Champa, 1957	FILM	x		
Curry, 1959	TV	x		
Davies, *et al*., 1958	TV			x
DeViney, 1963	TV	x		
Devitt, n.d.	TV			x
Dreher & Beatty, 1958	TV		x	
Dyer-Bennet, *et al*., 1958	TV			x

TABLE 2--Continued

AUTHOR/DATE		MEDIUM	ATTITUDE		
			POSITIVE or Better than what compared to	NEUTRAL or Equal to what compared to	NEGATIVE or Worse than what compared to
Evans,	1956	TV	x		
Evans, *et al*.,	1961	TV			x
Fordham Univ.,	1953	TV	x		
Frank,	1955	TV	x		
French,	1963	TV		x	
Fritz & Others,	1952	TV	x		
Geddes,	1962	TV		x	
Greenhill, *et al*.,	1962	TV	x		
Hagerstown,	1959	TV	x		

TABLE 2--Continued

AUTHOR/DATE		MEDIUM	ATTITUDE		
			POSITIVE or Better than what compared to	NEUTRAL or Equal to what compared to	NEGATIVE or Worse than what compared to
Hartman,	1960	FILM	x		
Head & Philips,	1961	TV	x		
Herminghaus,	1957	TV			x
Hunt,	1961	TV		x	
Jacobs & Bollenbacher,	1960	TV	x		
Janes,	1961	TV	x		
Kanner, *et al*.,	1954	TV	x		
Kansas City	1963	TV			x
Kazem,	1961	TV		x	

TABLE 2--Continued

AUTHOR/DATE	MEDIUM	ATTITUDE		
		POSITIVE or Better than what compared to	NEUTRAL or Equal to what compared to	NEGATIVE or Worse than what compared to
King, 1959	TV			x
Klapper, 1958	TV			x
Kumata, n.d.	TV		x	
Lepore & Wilson, 1958	TV		x	
Lofthouse, 1957	TV			x
Los Angeles, 1958	TV		x	
Los Angeles, 1959	TV			x
Macomber & Siegel, 1960	TV			x
Macomber, *et al.*, 1957	TV		x	

TABLE 2--Continued

AUTHOR/DATE		MEDIUM	ATTITUDE		
			POSITIVE or Better than what compared to	NEUTRAL or Equal to what compared to	NEGATIVE or Worse than what compared to
Meierhenry,	1955	TV	x		
Neidt & French,	1958	TV			x
Nelson,	1958	TV	x		
Noall & Winget,	1959	FILM	x		
Pollock,	1956	TV	x		
Purdue,	1956	TV		x	
Reede & Reede,	1963	TV	x		
Reid,	1960	TV		x	
Rock, *et al.*,	1951	TV	x		
Romano,	1957	FILM	x		

TABLE 2--Continued

AUTHOR/DATE		MEDIUM	ATTITUDE		
			POSITIVE or Better than what compared to	NEUTRAL or Equal to what compared to	NEGATIVE or Worse than what compared to
Romano,	1957	SLIDES	x		
Rottman,	1960	TV			x
Scheller,	1959	TV	x		
Scott,	1960	FILM			x
Seibert,	1958a	TV			x
Seibert,	1958b	TV		x	
Seibert,	1958c	TV		x	
Shimberg,	1954	TV	x		
Silagyi,	1961	TV	x		
Starlin & Lallas,	1960	TV	x		
Troop, *et al.*,	1958	TV			x

TABLE 2--Continued

AUTHOR/DATE	MEDIUM	ATTITUDE		
		POSITIVE or Better than what compared to	NEUTRAL or Equal to what compared to	NEGATIVE or Worse than what compared to
Torkelson, 1958	TV			x
Washington Cty, Md., 1960	TV	x		
Westley & Mobius, 1960	TV	x		
Wetter & Gable, 1959	TV	x		
Witty & Fitzwater, 1953	FILM	x		
Westley & Jacobson, 1963	TV	x		
	TOTAL =	37 POSITIVE	14 NEUTRAL	20 NEGATIVE

domly distributed among all three categories (in which case there would be 23.66 studies in each category) or if the distribution of the studies differed from a random distribution:

TABLE 3

χ^2 Analysis of the Number of Studies Finding Positive, Neutral, and Negative Attitudes Toward Media

CATEGORY	OBSERVED	EXPECTED	$\frac{(O-E)^2}{E}$	χ^2	p
Positive	37	23.66	7.51	12.03	$p<.01$
Neutral	14	23.66	3.95		
Negative	20	23.66	.57		
	71	71		$\chi^2_{(2,.01)}=9.21$	

The significant chi-square indicates that the studies are not distributed randomly among the three categories, and that there are significantly more studies (52%) which found that media yield positive attitudes, or "satisfaction in response" toward media, i.e., toward themselves.

2. "Satisfaction in Response to Subject Matter." Table 4 presents a concise summary of the results of the 33 studies which presented subject matter material to students by mediated methods and then obtained measures of the students' attitudes toward the subject matter. Again, most of the studies used television as the medium, but in this set of studies, ten--almost one-third--used film.

The total number of studies indicating positive

TABLE 4

Summary of Studies Concerned with
ATTITUDE TOWARD SUBJECT MATTER
After Using Media in Instruction

AUTHOR/DATE		MEDIUM	ATTITUDE		
			POSITIVE or Better than what compared to	NEUTRAL or Equal to what compared to	NEGATIVE or Worse than what compared to
Consitt,	1931	FILM	x		
Hirsch,	1949	FILM	x		
Knowlton & Tilton,	1929	FILM	x		
Potthoff, _et al_.,	1940	FILM	x		
Wood & Freeman,	1929	FILM	x		
Amirian,	1963	TV		x	
Becker, _et al_.,	1957	TV			x

TABLE 4--Continued

AUTHOR/DATE		MEDIUM	ATTITUDE		
			POSITIVE or Better than what compared to	NEUTRAL or Equal to what compared to	NEGATIVE or Worse than what compared to
Carner,	1962	TV	x		
Carpenter & Greenhill,	1955	TV			x
Caspers,	1956	FILM	x		
DeProspo,	1958	FILM	x		
Driscoll,	1957	TV	x		
Driscoll,	1959	TV	x		
Frazier & Evans,	1960	TV	x		
Janes,	1961	TV		x	
Kumata,	n.d.	TV		x	
Lottes,	1961	TV	x		

TABLE 4--Continued

AUTHOR/DATE		MEDIUM	ATTITUDE		
			POSITIVE or Better than what compared to	NEUTRAL or Equal to what compared to	NEGATIVE or Worse than what compared to
Lumsdaine & May,	1958	FILM	x		
Macomber & Others,	1956	TV			x
McDaniel & Filiatreau,	1965	TV			x
Moscowitz,	1964	TV			x
Nearing,	1962	TV		x	
Neidt & French,	1958	TV			x
Parsons,	1956	TV		x	
Rottman,	1960	TV			x
Schlaak,	1956	TV	x		

TABLE 4--Continued

AUTHOR/DATE	MEDIUM	ATTITUDE POSITIVE or Better than what compared to	NEUTRAL or Equal to what compared to	NEGATIVE or Worse than what compared to
Stuit & Others, 1956	TV	x		
Throop, *et al.*, 1958	FILM	x		
Washington Cty., Md., 1960	TV	x		
Westley & Mobius, 1960	TV	x		
Westover, 1958	TV			x
Tiemans, 1962	FILM	x		
Westley & Jacobson, 1963	TV	x		
	TOTAL =	20 POSITIVE	5 NEUTRAL	8 NEGATIVE

attitudes is 20; indicated neutral attitudes, 5; and indicating negative attitudes, 8. A chi-square was performed on these numbers (see Table 5) to determine if the distribution of studies differed from a random distribution.

TABLE 5

χ^2 Analysis of the Number of Studies Finding Positive, Neutral, and Negative Attitudes Toward Subject Matter

CATEGORY	OBSERVED	EXPECTED	$\frac{(O-E)^2}{E}$	χ^2	P
Positive	20	11	7.36	11.45	p<.01
Neutral	5	11	3.27		
Negative	8	11	.82		
	33	33		$\chi^2_{(2,.01)}=9.21$	

The significant χ^2 indicates that the studies are not distributed randomly among the three categories, and that there are significantly more studies (61%) which found that media yield positive attitudes, or "satisfaction in response," toward subject matter.

The studies concerned with "satisfaction in response" to subject matter also allow for another comparison, a between-media comparison. One hundred per cent of the studies using film as the medium found positive attitudes, while only 43.5% of the studies using television found positive attitudes. While the affective taxonomy proposed by this study does not take television into account, this interesting difference between film and television may indicate different places in such a taxonomy; further research comparing these media is needed.

3. "Preference for a Value" toward the subject matter. Because of the extreme difficulty of following and measuring action responses, there are very few studies which attempt to measure the effectiveness of media in eliciting "preference for a value." The seven studies that were found to deal with this problem utilized recordings or film as the medium.

Rulon's (1933) results indicated that recordings were of little value in motivating students to further study of the subject matter, and Reid's (1940) results concurred, indicating that radio broadcasts failed to stimulate more reading.

The teachers questioned by Wood and Freeman (1929) reported that films increased student motivation (action) as evidenced by increased reading and bringing materials to class. In Knowlton and Tilton's (1929) study, the group that saw the films increased class participation and voluntary reading. Potthoff, Larson, and Patterson (1940) found that films aided in motivating students to enroll in additional courses of a subject which was traditionally regarded with much indifference. However, May and Lumsdaine (1958) found that seeing a dramatic story-type movie based on a book did not stimulate more reading from the book.

The results of these few and ancient studies indicate that recordings are of little value in motivating further action, but that films can bring about "preference for a value" towards a subject matter.

Summary.--The research concerned with the effectiveness of instructional media in eliciting affective learning actually falls into three categories, but the attitude-change, and attitude-achievement studies are not relevant to the problem of this study. The studies that were relevant indicated three things: (1) in more cases than not (52%) media elicit "satisfaction in response," positive attitudes, toward themselves; (2) in more cases than not (61%) media yield "satisfaction in response," positive attitudes, toward subject matter; (3) films probably can, and recordings cannot, elicit "preference for a value," action, toward subject matter.

Conclusions.--The studies cited in this section differ considerably in sophistication, in measures of attitude used, and in whether they just measured attitudes based on media or whether they compared these attitudes to other attitudes. The first two differences certainly influenced the results of the studies, but there is nothing that can be done to improve the weaker studies now; the hope must be that in the future, research in this area will become more sophisticated in design and in attitude measurements. This study is attempting to provide some of the information needed for this increased sophistication.

The differences in the comparisons made in the different studies make interpretation difficult. Certainly the results show that media are effective in eliciting "satisfaction in response," and "preference for a value," toward media and toward subject matter. But concerning the question "are they more effective?" the conclusion must be less emphatic. The studies which compared media with some non-mediated method (as opposed to just evaluating media) indicate that they are more effective, but also indicate that this result is far from the final word on the subject. More research concerned with the relative effectiveness of media is needed, and this study is attempting to meet this need.

As is true in any field, theory related to the effectiveness of media in eliciting affective learning far outstrips the research evidence to back it up. However, much of this theory is related, directly or indirectly, to the problem of this study and warrants discussion.

Theory

Scope.--The theories to be discussed in this section include theoretical extrapolations from research, a theory concerned with the learning of attitudes, and several theories concerned with the importance of using media to elicit affective learning.

Potthoff, Larson, and Patterson Film Study.--In drawing implications from the results of their (1940) study which showed that films heightened interest, increased course-related activities, and increased the number of students enrolling for advanced courses in biology, Potthoff, et al., conclude that this finding alone justifies film use, since people enrolled in biology courses are likely to learn more biology than people not so enrolled (pp. 29-30).

This position, that the elicitation of affective responses is enough to justify the use of media, is similar to that of McDonald and Deese (cited earlier in this chapter). It supports the approach this study takes to the problem.

Baker and Popham's Embellished Program Study.--In a comparison of embellished and nonembellished versions of the same program, Baker and Popham (1965) found significant differences in interest toward, and enjoyment of, the program. Drawing implications from this result, they hypothesize that audio and visual embellishments "may engender content and/or procedure approaching tendencies which influence receptivity to subject matter and to future instruction by the same procedure" (Baker and Popham, 1965:398).

The results of this study and the hypothesis indicate that media are more effective than nonmedia in eliciting "satisfaction in response" and "preference for a value" toward both media and subject matter.

May and Lumsdaine's Audio-Visual Embellishments Study.--The original problem of this study (May and Lumsdaine, 1958, Chapter 5) was to discover whether the use of a fancy presentation method was advantageous or not. It was hypothesized that

> an advantage for the fancy presentation method might be anticipated, on the one hand . . . because of enhanced interest and motivation, resulting from the cartoon-and-sound-effects devices. . . . On the other hand, the amusing character of the fancy presentation method might have the disadvantage of distracting from the primary task of mastering the associations. (May and Lumsdaine, 1958:60)

As might be expected from the above discussion of attitude-achievement studies, the fancy presentation method did not increase learning.

The authors' explanation of this result, however, indicates the effectiveness of media in eliciting affective responses.

> The hypothesis that immediately suggests itself is that they *do indeed serve as attention getters*, but that their net effect is to draw attention [to themselves and] away from rather than toward the essentials of the learning task.
>
> The possible positive effects of the embellishments, would, then, to be worthwhile, have to more than offset this distracting influence. . . . In particular, under circumstances *where attention to what is being presented* --insuring exposure to the learning materials--*is the most critical thing, the presence of the entertaining material might well make the difference between exposure* (watching) *and non-exposure* . . . and thus result in effecting *some learning*--even if not very efficient--rather than no learning at all. (May and Lumsdaine, 1958:68-69) [Italics added.]

Thus, the authors admit that the media did elicit "satisfaction in response" or interest which did insure exposure to the material. However, the authors' downgrading of the importance of this affective response must be contrasted with Krathwohl's notion (cited earlier) that this affective response is a prerequisite to learning. If Krathwohl's position is correct, and the studies cited earlier indicate that it is, then the *affective response is always important*. Since the affective response is always important, *the use of media*, which elicit this affective response, *is always important*.

Wallington's Taxonomy of Student Motivation.--Wallington (1968) is more limiting than Krathwohl about when the affective response is important. He maintains that it is a function of which of the following three classes of motivation the student is in:

> (1) . . . *students who are highly motivated and will learn that which is presented to them under almost any circumstances*. This drive may be external to school, e.g., parental pressures to excell. . . . In such a case, the student generally does well in any but the worst of situations.
>
> (2) . . . *students who are actually motivated in the wrong direction, that is, resistant to instruction. These are polar opposites of the first group.* While we may for instructional purposes consider them negatively motivated, they probably have as much motivation as the first group. It is, however, channeled in the wrong direction for formal instruction.
>
> (3) . . . *probably the largest group* . . . [*students*] *who are not active but passive*. They respond in neither a positive or negative fashion, but are

> simply "there in body." If the day's offerings stimulate them, they learn; if they are bored, they do not. (Wallington, 1968:1)

It is only for the student in this third class of motivation, "who will attend only if the vehicle is interesting and warrants attention," that the affective response and the media that elicit it are important (p. 3). The student in the third class is the most important, however, because his attitude can be changed, and because he represents the majority of students. Thus, "while the mediated format may not be necessary in terms of the content, it may be imperative in terms of the learner" (p. 3).

Wallington is not concerned with whether mediated instruction works in this way "because of the inherent affective strength of the medium" or because "the medium is new and exciting" or because it "is a part of the students' expected input and has associated with it certain positive affect." He concludes that "there is sufficient reason to utilize such tools merely on the basis that they work and leave the investigation of why to others" (p. 3).

A theory that helps to explain why media work in eliciting positive affective responses is one put forth by Edling.

Edling's Theory of Attitudinal Learning.--Edling (1963) believes that one way of learning attitudes, "persuasion," is extremely relevant to education. He describes this learning process in the following manner:

> . . . some change agent, partially through verbal or visual symbols, apparently establishes an association in the learner's mind between . . . [a criterion] object (toward which a change in attitude is desired) and a referent object toward which an attitude is more strongly held, with the result that a change in attitude occurs toward the . . . [criterion] object. (Edling, 1963:3)

Usually this process, as followed in attitude change studies, involves two actions or objects, such as buying insurance and children's security, and "the development of a new technique for associating, by mass media message, two objects of the type described" (Edling, 1963:4).

This process can be looked at in a different way, however, in an educational situation. In such a learning situation, the criterion object, toward which a positive attitude is desired, is the subject matter. The question is, what is a referent object which has a strong positive attitude held to it and which can be associated with the subject matter. The studies cited in the last section, plus everyday observations regarding the number of people who watch television, go to the movies, listen to radios and recordings, take and view slides and 8mm films, and enjoy psychedelic mixed-media shows--the studies plus these observations show that media elicit strong positive attitudes.

Therefore, in one paradigm of attitude change, media can be the referent object, and by associating media, with the positive attitude they elicit, and subject matter, the attitude toward subject matter will become positive.

This study, then, in effect, is a test of the validity of a variation of this paradigm.

Summary.--This section has reviewed several theoretical formulations related to the effectiveness of instructional media in eliciting affective learning. They seemed to indicate that media can elicit affective learning, both "satisfaction in response" and "preference for a value," and should be able to do so more effectively than other means. They stated that the use of media to elicit the affective responses was always important, but was especially important with a student who was passive and responded only if the presentation interested him. One theory presented a paradigm for learning of attitudes which explained how media could elicit positive attitudes toward subject matter.

Conclusions.--The theories presented in this section parallel the research studies presented in the last section in their agreement that media can elicit positive affective responses, "satisfaction in response," and "preference for a value." They go beyond the research by indicating (1) that media can elicit these responses better than other means; (2) that it is important that they do this; and (3) how media can do this. However, these latter conclusions are unsupported by data. It is the purpose of this study to provide that data.

Summary and Conclusions of the Chapter

This long and involved chapter has reviewed the literature related to: definitions of attitude; the importance of the affective domain; instructional media and affective learning, including the research that is not related to this study, and the research and theories that are related to the effectiveness of media in eliciting affective responses.

As a result of this review, the following conclusions can be drawn:

1. There now exists an operational definition of attitude, or affective learning, which clarifies terminology in the affective domain, takes into account the intensity of the affective response, and allows for prediction of the control of the response over behavior.
2. The affective domain is extremely important, since affective responses, especially "satisfaction in response" and "preference for a value," seem to be prerequisites for cognitive learning.
3. In school, positive affective responses to the subject matter and the presentation modes must be developed, especially in passive students who do not have an external source of motivation.
4. Media can effectively elicit these positive affective responses of "satisfaction in response" and "preference for a value," both toward themselves and

toward subject matter, possibly as a result of their being referent objects with which positive attitudes are already associated.

5. *Media may be the most effective* referent objects available to elicit these positive affective responses, but *different media may have different degrees of effectiveness*.

The study described in the next chapter is an attempt to test the validity of the last two conclusions as well as to test the validity of certain techniques for affective domain research.

CHAPTER III

METHODOLOGY

This chapter will describe the subjects, the measures of the dependent variables and the instrumentation used to obtain the measures, the presentation and test materials, the overall design, the field procedure, and the statistical analysis for each of the hypotheses, used in this study.

Subjects

Subjects were all the students in the five fourth-grade classes and the four fifth-grade classes of the Longden Elementary School, Temple City Unified School District, Temple City, California, who were present on the day the study was conducted. The number of Ss in the fourth grade were 94, and the number of Ss in the fifth grade were 103.

Dependent Variables

Two selections had to be made with regard to the dependent variables: what to use as operational measures of "satisfaction in response" and "preference for a value" and what instrumentation to use to obtain these measures.

Measures

May and Lumsdaine (1958) summed up the state of attitude measurement before the advent of Krathwohl's (1964) Taxonomy:

> A person's interest may be indicated either by what he says or by what he does or both. Verbal expressions of interest may be elicited by a questionnaire or an interview or may appear as spontaneous comments. Nonverbal activities can include paying closer attention, putting forth extra effort to find out more about the subject by writing letters of inquiry, searching for and reading relevant books and articles, and the like. *Verbal expressions of interest are rather readily obtained, but are generally considered less convincing indices of interest than spontaneous performance of related activities.* (May and Lumsdaine, 1958:185-186) [Italics added.]

As the *Taxonomy* indicates, however, expressions of interest are not less convincing indices than spontaneous performance; they are both valid indices of different intensities of affective response. Expressions of interest measure "satisfaction in response" and actions measure "preference for a value."

Since both of these responses are important in their own ways, it was decided, in this study, to obtain measures of both.

Measure of "Preference for a Value."--The action response was obtained by giving the *Ss* the option of volunteering to read a book based on one of the four presentations. It was made clear that the selection of a book was purely optional, and that they were not required to do so.

If they wanted a book, however, they had to select only one. The voluntary selection of a book was the measure of "preference for a value."

Measure of "Satisfaction in Response."--The measurement of the interest response presents more of a problem than does the action response. Edwards (1957) indicates that direct questioning to ascertain attitudes is not a useful technique because it does not elicit the needed objectivity and insight. Therefore many paper-and-pencil attitude "scales" have been developed for the purpose of obtaining attitude scores. Several different types of attitude scales have been developed and used: (1) the equal appearing interval scale (Thurstone and Chave, 1929); (2) the summated rating scale (Likert, 1932); (3) the scalogram analysis technique (Guttman, 1950); (4) the semantic differential technique (Osgood, Suci, and Tannenbaum, 1957). Each of the techniques has the S respond to statements or words related to the attitude and rates them along some type of scale. The scales, however, in addition to being difficult to take and to score, do not yield valid and reliable enough measurements (Miller, 1957).

Another, and more fruitful, approach to the measurement of "satisfaction in response," or interest, involves the measurement of physiological responses which are related to emotional states. Dysinger and Ruckmick (1933), for example, in a study related to this one, showed that viewing motion pictures can arouse psychogalvanic responses and produce pulse changes characteristic of strong emotional response. The modern work in this area has been done by Bergum and Lehr (1966a-e) and Bergum, Lehr, and Dooley (1967). The results of their first study (1966a) indicate that

> . . . it is feasable to measure individual affective states objectively without recourse to overt expressions of these states. (p. ii)
>
> . . . four of the six objective measures, response latencies, pulse rate, pulse pressure, and pupillary dilation, tended to discriminate significantly between pleasant and unpleasant affective states. (p. i)

In each of the six studies, they found that capillary pulse pressure discriminated significantly between positive, negative, and neutral affective states. In their conclusion in the final study (1967), they state that the measure that was found to be most useful and most general in application, in addition to being the least obtrusive, was capillary pulse pressure.

Further, they recommend "the application of this tool to educational technology . . . to evaluate the motivational-affective value of educational materials" (Bergum, Lehr, and Dooley, 1967:10). Since this recommendation applies directly to the objectives of this study, it was decided to use capillary pulse pressure as the measure of "satisfaction in response."

Instrumentation

No instrumentation was needed to deal with the "preference for a value" book selection responses.

The instrumentation used to collect the "satisfaction in response" pulse pressures consisted of ten Bio-Com, Inc., Model #1010 Pulse Transducers, eight of which were connected to the pens of an eight-track Offner Model R Chart Recorder and two of which were connected to the pens of a two-track Brush Mark II Chart Recorder.

Materials

Two sets of materials were utilized in this experiment: Presentation materials and test materials.

Presentation materials

The presentation materials included film, slides, tape, and teacher presentation.

Film.--The films which were the basis of this study were from the McGraw-Hill "United States Geography--Social Studies Series, Set 1." This series is aimed at grades four through six.

It was accepted for purchase by the Los Angeles County Educational Media Division on the basis of positive, but not raving, evaluations by a panel of teacher evaluators. This evaluation indicates that it is an acceptable but not exceptional film series, and for this reason it seemed suited to the objectives of this study.

The eight titles in this film series are:

The Central Farming Region: Food for the Nation
The Great Lakes Area: Men, Materials and Machines
The Great Plains: From Green to Gold
The Gulf Coast Region: The South's Land of Opportunity
The Middle Atlantic Seaboard Region: Great Cities--Megalopolis
The Rocky Mountain Area: Backbone of the Nation
The Southern New England Region: New Industries
The Southwest: Land of Promise

However, only four films were needed for the design of this study. The selection of the four films to be used involved two operations. First, the film concerned with the southwest was eliminated from consideration under the assumption that the S already had developed a positive attitude toward the southwest as a result of living in that area. Second, by drawing names from a hat, the four films to be used were selected randomly from the remaining seven. The films used were:

The Great Plains (henceforth abbreviated "p")
The Gulf Coast ("c")
The Middle Atlantic Seaboard ("m")
The Rocky Mountains ("r")

Each of the films was fifteen minutes in length. However, due to time constraints and to a desire to leave the Ss wanting to see more (the action response), it was decided to show only the first five minutes of each film, using a sort of "teaser" approach. The end of the sections shown did, though, represent the end of one of the topics covered in the film, and the section could have stood on its own as a film.

The five-minute segments of each of the four selected films were used as the standard from which the other presentations were developed.

Slides.--The slides consisted of still pictures taken directly from the films. Approximately twenty frames from each of the film segments were copied into 35mm slides. The frames were selected by the *E* so that there was one slide for each scene (different camera shot) in the film.

The slide treatment included, in addition to the slides, a commentary provided by the teacher--a procedure which is common in classroom instruction. This commentary was the same as the commentary used by the teacher in the "teacher presentation" treatment. Its development is described below.

Tape.--The tapes were dubbed directly from the sound track of the film segments. Therefore they contained, in addition to the narration, the background music and sound effects used in the film.

Teacher Presentation.--The teacher presentation, as well as the teacher commentary accompanying the slides, was developed in three stages. First, the sound track of each of the film segments was transcribed (see Appendix I). It was then edited by the *E* in terms of its treatment; first person statements and references such as "this picture shows" were rewritten. Finally, at the request of the teachers involved in the study, it was put in a sentence outline form, with each new section of the outline corresponding to a new topic in the film (see Appendix II). Teachers were allowed to either read directly from the outline or to use their own words to paraphrase the outline.

Test Materials

The test materials included books and test slides.

Books.--The books which were offered to the Ss were actually the transcriptions of the film segments (see Appendix I), typed on 8 1/2" by 11" paper, with a cover, consisting of the name of the area handwritten in large letters, added. Students were not allowed to see the books before they made their choices, so this crude format did not influence the book selection responses.

Slides.--The test slides were used in this study to provide the stimuli to elicit the pulse pressure responses. There were four types of slides used.

1. Control. Thirteen control slides were shown to the Ss. The purpose of these slides was to provide a base response with which to compare the responses to the other slides. The slides were made simply by photographing the Kodak 18% Grey Card.

2. Word. The Ss saw four word slides, one for each area of the country. The purpose of these slides was to elicit the "interest in subject matter" responses. They consisted of the title frames of the four films, each of

which showed the name of the area superimposed over a dark green map of the United States.

3. *Picture*. Four picture slides were shown to the *S*s. Their purpose was also to elicit the "interest in subject matter" responses. They consisted of one slide selected from the slide treatment for each area.

4. *Presentation Mode*. The *S*s were shown five presentation mode slides, which contained the names of the four presentation modes used in this study plus the word "school." The purpose of these slides was to elicit the "interest in presentation mode responses." They were prepared by typing the appropriate word on a piece of white paper and photographing it.

The test slides were presented to the *S*s in the following order which is randomized within each type of slide:

Purpose of Slides	Slide Order
HABITUATION	Control (Used to accustom *S*s to testing situation; not used in analysis of data)
WORDS (Satisfaction in Response toward SUBJECT MATTER)	Control
	Middle Atlantic Seaboard
	Control
	Great Plains
	Control
	Gulf Coast
	Control
	Rocky Mountains
PICTURES (Satisfaction in Response toward SUBJECT MATTER)	Control
	Middle Atlantic Seaboard
	Control
	Great Plains
	Control
	Gulf Coast

Purpose of Slides	Slide Order
	Control
	Rocky Mountains
PRESENTATION MODE (Satisfaction in Response toward PRESENTATION MODE)	Control
	Tape
	Control
	Teacher
	Control
	Film
	Control
	Slides
	Control
	School

Design

Objective

The objective of the design was to provide a way of determining, under controlled conditions, the effects of the four presentation modes (F, S, T, and TCH) on the attitudes ("satisfaction in response" and "preference for a value") toward the four subject matters (m, p, c, and r) and toward the four presentation modes (F, S, T, and TCH). Both the overall and the specific designs were selected to facilitate the measurement of these effects.

Overall Design

The overall design that seemed best suited to meet this objective was a combination of two of Campbell's and Stanley's (1963) basic designs, each of which was modified slightly.

All-Groups Design.--The overall experimental design which took all groups into account was based on Campbell's and Stanley's Design #6, Post-Test Only Control Group Design. The original design (using Campbell and Stanley notation where R=random assignment, X=treatment, and O=test) was as follows:

1. R X O
2. R O (p. 178).

Group 1 receives both the treatment and the post-test, while Group 2 receives only the post-test. There is no pretest given.

This design was necessary for this study because of Edling's (1963) finding that, in the affective domain, pretesting depresses post-test scores. Despite its lack of a pretest, this design does control for history, maturation, testing, and selection effects and is considered to be a strong "True Experimental Design."

Modifications.--The basic design was modified in two ways to better fit the conditions of the study.

1. Randomization. In an attempt to reduce the confounding effects of experimental motivation (cf. Chapter I), the experimental materials were presented to the Ss as ordinary subject matter in their own classrooms. Thus, the class, rather than the individual S, became the basic experimental unit. The randomization for this study, then, involved the assignment of classes, instead of individuals, to treatments. The modified design was as follows:

1. R (classes) X O
2. R (classes) O

2. Treatments. According to the paradigm above, the control group, consisting of one class, received just the post-test, which in this study measured the preexperimental attitudes. The treatment group, consisting of eight classes, received the treatments and the post-test. The treatments in this study, however, were much more complex than those provided for by Design #6. Therefore, another "sub-design" was needed for the treatment groups.

Treatment-Groups Design.--The ideal setup for the experimental treatments, in terms of the design objective, would involve exposing each class to each of the presentations on each of the four subject matters in every possible order, and then measure the affective responses to each of the subject matters as a function of the treatments used to present it. This set of treatments would have involved 16 presentations for each class, which would have introduced time and fatigue factors, and 196 classes, which would have introduced insurmountable logistical problems. Thus, the advantages of this "repeated replications" design are far outweighed by its complexity and difficulty of execution, and it was decided to use a slightly less ideal, but considerably more practical, design.

The design selected was Campbell's and Stanley's Design #11, Counterbalanced, or Latin Square, Design. The paradigm for this design is as follows:

	Time 1	Time 2	Time 3	Time 4
Group A	X_1O	X_2O	X_3O	X_4O
Group B	X_2O	X_4O	X_1O	X_3O
Group C	X_3O	X_1O	X_4O	X_2O
Group D	X_4O	X_3O	X_2O	X_1O

(Campbell and Stanley, 1963:221)

The interpretation of this design in terms of this study is that each class is exposed to only one presentation on each of the four subject matters, but each presentation is by a different mode. Thus, in this experiment, each class received one combination of the four media and the four subject matters. For example, one class might be presented:

Middle Atlantic	by	Film
Great Plains	by	Slides
Gulf Coast	by	Tape
Rocky Mountains	by	Teacher

In addition, each class receives a different combination. Thus, a second class might be presented:

Middle Atlantic	by	Tape
Great Plains	by	Film
Gulf Coast	by	Teacher
Rocky Mountains	by	Slides

Modifications.--This Latin Square Design was modified in two ways to better fit the conditions of the study.

1. Order. In this study it was necessary to account for the orders of presentation of both the subject matters and the modes of presentation since the attitude toward one of these might carry over and effect the attitude toward

another one. To control for this, a special form of latin square was used. This was Williams' (described in Edwards, 1960, and Cochran and Cox, 1957) Balanced Latin Square Design for Carry-Over Effects. In this version of the latin square, every treatment follows every other treatment exactly once. This procedure distributes the carry-over effects evenly, and allows for an analysis of the significance of the carry-over effects.

Since two order effects, mode and subject matter, were involved in this study, two different balanced latin squares were used:

1. holding subject matter order constant (order randomly selected) and varying mode order (according to Williams' paradigm);
2. holding mode order constant (order randomly selected) and varying subject matter order (according to Williams' paradigm).

Testing.--A further design consideration involved the timing of the testing procedures. Since, as was indicated above, it was desired to reduce the experimental motivation as much as possible, an attempt was made to keep the fact that this was an experiment a secret until the time for the testing arrived.

The usual procedure for testing with the latin square is: Treatment A, Test A, Treatment B, Test B, etc. The use of this procedure in this study would have, however, indicated its experimental nature to the Ss sooner than was desired.

As a result, the procedure was modified so that all four treatments were administered first, and then the tests of all four treatments were administered: Treatments A, B, C, D; Tests A, B, C, D.

The order of administration of the two tests, voluntary book selections (abbreviated vbs) and capillary pulse pressure (cpp), is also significant. Since the vbs responses were the type of responses that might be frequently found in a classroom situation, while the cpp responses were not, it was reasoned that ordering of the tests was important. If the cpp test were first, it would "tip off" the experiment, and influence the vbs responses, while if the vbs responses were first, they would be less likely to tip off the experiment and influence the cpp responses.

Thus the order of the tests was: vbs, followed by cpp.

Design of the Experiment

The application of these general design considerations to this experiment is shown in Table 6.

Field Procedure

The field procedure for the study involved two phases: teacher conferences and experimentation.

Teacher Conferences

Before the experiment was carried out, the E held

TABLE 6

Design of the Experiment

I. ABBREVIATIONS

CLASSES	MEDIA	SUBJECT MATTER
41 Fourth grade	F = Film	m = Middle Atlantic
42 experimental	S = Slides	p = Great Plains
43 classes in	T = Tape	c = Gulf Coast
44 Square I	TCH = Teacher	r = Rocky Mountains

45 = Control class

	TESTS
51 Fifth grade	
52 experimental	
53 class in	vbs = voluntary book selection
54 Square II	cpp = capillary pulse pressure

II. LATIN SQUARES

SQUARE I

CLASSES

	Present	41	42	43	44
Subject Matter	m	F	S	T	TCH
	p	S	T	TCH	F
	c	TCH	F	S	T
	r	T	TCH	F	S
Test		vbs cpp	vbs cpp	vbs cpp	vbs cpp

SQUARE II

CLASSES

	Present	51	52	53	54
Media	T	m	p	c	r
	TCH	p	c	r	m
	F	r	m	p	c
	S	c	r	m	p
Test		vbs cpp	vbs cpp	vbs cpp	vbs cpp

three conferences with the teachers who were involved. At the first conference, teachers were told about the goals of the study and were presented with some of the theoretical background. They were then asked if they would be willing to assist the E, and they consented.

The E put forth a tentative procedure for the experiment and elicited comments from the teachers. On the basis of these comments, several changes were made, including the time for conducting the study, the method of introducing the presentations, and the method of eliciting the book selection responses.

A week before the study was to be conducted, the second conference was held. At this time, the teachers received an "Experimental Procedures Manual" (see Appendix III for one teacher's manual). All the manuals contained the following: introductory letter; background of the study; design of the experiment; description of the specific procedures to be followed throughout the entire study; outline for introducing the four presentations; outline for eliciting book selections; outline for introducing capillary pulse pressure.

In addition to the elements that appeared in all manuals, there was, in each teacher's manual, a section that had been prepared especially for that teacher. It contained a page for each presentation, indicating what combination of presentation mode and subject matter was involved, how it should be introduced, and what his or her role in the presentation, if any, was. When the teacher was involved, as in the teacher and slide presentations, the outline of the material to be presented was included.

The morning the experiment was to be conducted, the third and final conference was held. During this time, the E answered the few questions the teachers had regarding the experimental procedure.

Experimental Procedures

The experiment was conducted on Friday, May 31, 1968. Students entered their classrooms at 8:30 AM, and after about fifteen minutes of the usual clerical chores (attendance, lunch money, etc.) the teachers began the experiment.

Introduction.--The introduction to the presentations, which set the tone for, but minimized the experimental nature of, the entire procedure was based on vacations. It stated that summer vacation was coming up, that one of the things the Ss could do during the vacation was to travel, that there were many different areas of the country to travel to, and that now they would have a chance to find out a little about four of these areas.

Presentations.--Then the presentations began. The teacher introduced each one by saying "The next area of the

United States we will find out about is the _____________."
If the presentation mode for that area was film, tape, or slides, a research assistant at the rear of the room started the appropriate piece of equipment. The research assistant had a copy of the transcription of that presentation in which he followed along. When the presentation reached the end point, which was indicated in the transcription, the assistant turned off the equipment. In addition, in the cases of slides, he advanced the slide projector at the points indicated in the transcription. If the presentation was the teacher mode or the slide mode, the teacher read, or talked from, the outline. The teacher concluded each presentation by saying, "If you would like to know more about the _____________, you will have a chance, later, to pick a book that will tell you more about it." Students then took a stretch. This procedure was repeated until the _S_s had been exposed to all four presentations. This presentation section was omitted in the control class.

Book Selections.--After all four presentations were finished, the teachers elicited the voluntary book selections. They told the _S_s that they could now select a book to find out more about one of the areas, that they could select _only one_ book, and that they were _not required_ to select a book--that it was purely voluntary. _S_s were instructed to write down on a piece of paper the name of the area, if any, about which they wanted a book. The teachers collected the slips of paper and promised to distribute the books later. Ss then had their regularly scheduled recess.

Pulse Pressure.--Pulse pressure measurements were taken on the five fourth-grade classes first. Therefore, upon returning from recess, the fifth-grade teachers continued with their regularly scheduled lessons, while the fourth-grade teachers introduced the pulse pressure technique and the testing process to the Ss. They told the Ss that the purpose of their seeing and hearing the materials was so that they could evaluate the materials for the E, who was trying to sell them to the school, but wanted to get their reactions first. The teachers explained how their reactions were going to be collected, and what the pulse transducer looked like. They emphasized that it would not hurt.

Ss were then taken to the testing room. Ten Ss were tested at a time, two from each of the five fourth-grade classes. One of the research assistants explained the transducer, how harmless it was, and how important it was for them to keep their hands still. The transducers were taped to the index finger of the Ss' non-dominant hand, and the wires were taped around their wrists to guard against extraneous motions. The lights were then turned out and the Ss were shown the 27 test slides, with each slide visible on the screen for five seconds. After the slides were finished, the lights were turned on, and the transducers were removed from the Ss' fingers. They were asked again which book, if any, they wanted to read, and this time they were given the book they selected.

The Ss were then returned to their classrooms and ten more Ss were brought to the testing room. This procedure continued until all the fourth-grade students had been tested.

After all fourth-grade students had been tested, fifth-grade teachers introduced the Ss to the pulse pressure technique, and the above procedure was followed for fifth-grade classes until the school day ended at 3 PM. At this time, the experiment ended.

Statistical Analysis

For the purpose of this section, the hypotheses already stated in experimental form in Chapter I will be restated in the "null hypothesis" form, and the statistical analyses used to test each hypothesis will be described. First, however, it is necessary to discuss two preliminary points: (1) the ways in which both the capillary pulse pressure scores and the book selection scores were obtained; (2) which scores were actually used in the analyses.

Pulse Pressure Scores

The basic score for the analysis of pulse pressure was the individual raw score. No analysis was performed on this score directly, but it was used to obtain the six other types of scores on which analyses were performed. These five types of scores were: class raw scores; class ratio scores, numerical and nominal; class difference scores, numerical and nominal.

Individual Raw Scores.--The pulse data, for each subject, obtained from the experiment was in the form of a series of peaks on a roll of chart paper. The *E* divided this series of peaks into sections, so that each section represented the subject's reaction to one of the test slides. For each subject there were, depending upon his pulse rate, eight to twenty of these peaks for each slide.

For each slide, the magnitude of each of the peaks was counted. All of the magnitudes were added together to obtain a slide total. This total was divided by the number of peaks for the slide yielding a mean. These means became the raw scores for each slide for each subject. Thus, there were 27 raw scores obtained for each subject.

Class Raw Scores.--Since the unit of analysis in this study was the class, the individual raw scores had to be converted to class raw scores. Within each of the nine classes, the class raw score for each slide was determined. The raw scores for each subject in that class, on that slide, were added together to yield a total, and this total was divided by the number of students in that class to yield a mean. These means became the class raw scores for each slide. Thus, there were 27 class raw scores for each of the nine classes.

These class raw scores were not enough to provide an accurate test of the hypotheses, though, according to Bergum's and Lehr's (1966b) findings. They found that pulse pressure shows "session sensitivity"; i.e., "capillary pulse pressure tends to increase systematically as a function of trials" (p. 25). This increase, then, does not give an accurate reading of the pulse pressure scores to items at the end of the testing sequence. Therefore, four other methods of analysis, which would eliminate this increase by mathematical transformations of the scores, were utilized.

Class Ratio Scores.--The class ratio score is similar to the percentage score used by Bergum and Lehr (1966b). For obtaining these scores, each word, picture, and presentation mode slide was paired with the control slide which directly preceded it (see this chapter, "Test Materials," for test slide sequence). Then, for each subject, the raw score for each word, picture, and mode slide was divided by the raw score for the corresponding control slide; e.g., "m"/control 1, "p"/control 2, "c"/control 3, etc. This yields the individual ratio score for each word, picture, and mode slide.

Then, within each class, for each slide, all of the individual ratio scores were added together, and the total was divided by the number of individuals in that class.

This mean was the class ratio score for each slide. There were 13 class ratio scores for each of the nine classes. These scores were the numerical scores.

It was also decided to convert the class ratio scores on the word and media slides into three nominal categories: high, neutral, and low. For this purpose, first a frequency distribution of all the individual ratio scores for each word slide was constructed. The distributions are presented in Table 7.

TABLE 7

Frequency Distribution of INDIVIDUAL RATIO SCORES for Each of the WORD SLIDES

	Frequencies				
Class Interval	m	p	c	r	Nominal Value
1.45-1.99	1	1	1	1	
1.40-1.44	3	2	2	1	
1.35-1.39	0	1	0	0	
1.30-1.34	0	2	2	1	
1.25-1.29	2	2	4	2	High
1.20-1.24	3	2	1	1	
1.15-1.19	6	1	6	2	
1.10-1.14	4	5	6	7	
1.05-1.09	8	11	9	12	
1.00-1.04	13	17	13	13	Neutral
.95- .99	12	16	17	19	
.90- .94	8	4	5	6	
.85- .89	5	2	3	3	
.80- .84	3	4	2	3	
.75- .79	1	1	0	1	
.70- .74	0	0	1	1	Low
.45- .69	3	1	1	0	

On the basis of the distribution, the numerical scores were assigned *nominal values*, as shown in the right column of the table. These nominal values were utilized by changing them into proportions. The number of *high scores* in each class, on each *word slide*, was determined. This number was divided by the number of *Ss* in that class to give the *proportion of high scores* on *each word slide* in *each class*. Each of the nine classes, then, had four *proportion scores* based on *ratios*, one for each *word slide*.

The same procedure was followed for the *media* slides. The frequency distribution of *all* the *fourth*-grade *individual ratio scores* for *each media slide* is presented in Table 8.

On the basis of the Distribution, the numerical scores were assigned *nominal values*, as shown in the right column of the table.

These *nominal scores* were also changed to *proportions*. The number of *high scores* and the number of *low scores* in each class on *each media slide* was determined. This number was divided by the number of *Ss* in that class to give the *proportion of high scores* and the *proportion of low scores* on *each media slide* in *each class*.

Class Difference Scores.--The class difference scores were calculated in a manner similar to that used for the ratio scores. First the individual difference scores

TABLE 8

Frequency Distribution of FOURTH Grade INDIVIDUAL RATIO SCORES for Each of the MEDIA SLIDES

Class Interval	Frequencies				Nominal Value
	T	TCH	F	S	
1.35-1.59	1	0	1	2	
1.30-1.34	1	2	1	1	
1.25-1.29	0	1	1	4	High
1.20-1.24	4	2	6	1	
1.15-1.19	4	5	2	4	
1.10-1.14	9	6	8	4	
1.05-1.09	13	10	8	11	
1.00-1.04	17	20	16	16	Neutral
.95- .99	5	6	7	12	
.90- .94	4	5	12	9	
.85- .89	1	6	2	3	
.80- .84	6	4	3	3	
.75- .79	1	1	4	1	Low
.70- .74	4	1	1	0	
.65- .69	1	2	0	0	
.60- .64	0	1	0	0	

were obtained by taking the *difference* between each *word*, *picture*, or *mode* slide and its corresponding *control slide*; e.g., "m"--control 1, "p"--control 2, "c"--control 3, etc. Then all the scores for each slide in each class were added together and divided by the number of *S*s in that class to give the *class difference scores* for *each class* on each of the *13 slides*. These scores were the *numerical scores*.

The class difference scores for *word slides* were also converted into *nominal* categories. Again, a frequency distribution was constructed, this time for all the *individual difference scores*. This distribution is shown in Table 9.

TABLE 9

Frequency Distribution of
INDIVIDUAL DIFFERENCE SCORES
for Each of the WORD SLIDES

	Class Interval	Frequencies m	p	c	r	Nominal Value
	2.50-2.99	2	3	1	3	
	2.00-2.49	2	2	4	3	
	1.50-1.99	2	5	2	1	High
	1.00-1.49	9	2	8	3	
	.50- .99	9	9	6	12	
POSITIVE	.00- .49	14	24	21	17	Neutral
NEGATIVE	.50- .01	16	15	18	21	
	1.00- .51	8	5	3	7	
	1.50-1.01	4	3	1	1	
	2.00-1.51	3	2	4	1	Low
	2.50-2.01	1	1	1	3	
	2.00-2.51	0	0	2	0	

On the basis of this distribution, the numerical scores were assigned *nominal values*, as shown in the right column of the table.

Finally, the number, and then the *proportion of high scores* on *each word slide* in *each class* was calculated. Each class, then, had four *proportion scores*, based on *differences*, for *word slides*.

Scores Utilized.--Not all pulse scores obtained were utilized in analyses.

The first variable on which scores were eliminated was *slide type*. The data for the *habituation* slide was eliminated, since the only purpose the slide served was to accustom the *S*s to the testing situation. The *control* slides were utilized only to provide data from which to calculate the ratios and differences, and they were never considered by themselves. The *picture* slides provided a special problem. They were originally included to provide an alternative means (to the *word* slides) of measuring "satisfaction in response" to *subject matter*. However, the fact that they were pictures interacted with the treatments, and they were really testing "satisfaction in response" to the *pictures they showed instead*. As a result, the scores from only two sets of slides were used in the analyses:

1. *Word* slides, to measure attitude toward *subject matter*;
2. *Presentation mode* slides, to measure attitude toward

media.

Even all the scores for these two sets of slides were not used in every analysis. In the "Analysis of Hypotheses" section of this chapter, the specific set of scores used for each test is indicated. However, some general statements can be made about the scores used.

Most of the scores used are those of the fourth-grade Ss. This is because, due to time constraints, only sixteen fifth-grade Ss were given the pulse pressure test. The only fifth-grade pulse data used were the ratios, numerical scores, because these scores seemed not to be as affected by the small number of Ss as were the other scores. Thus, unless otherwise indicated, all pulse data refers to fourth-grade data.

Most of the scores used are Numerical scores. The Proportion, or Nominal, Scores were used only when it was necessary to view the data from another perspective.

Most of the scores used are ratios. This selection is based on the fact that the method has already been validated by Bergum and Lehr (1966a-e), the fact that the numbers are easier to work with and interpret, and the fact that the ratios are less affected by erratic, extreme scores.

Book Selection Scores

The procedure for analyzing the book selection responses was considerably more simple than that for pulse pressure scores.

Calculation.--The number of Ss in each class that selected each of the four books was counted. For each book in each class, then, this number was divided by the total number of Ss in that class. This yielded, for each class, the proportion of that class that had selected each book. Each of the nine classes, then, had four proportions for book selections.

Scores Utilized.--In collecting the book selection responses, data from both the fourth and fifth grades were collected by the teachers after the presentations. In addition, another set of book selection responses was elicited by the E from the fourth grade Ss after testing. Therefore there was one set of fifth-grade book selection scores, and two sets of fourth-grade responses. Analyses were performed on all three sets of responses.

Analysis of Hypotheses

Each of the experimental hypotheses is stated below in Null form. Next to each hypothesis is indicated the statistical tests performed on the data to test the hypothesis. Also indicated are the source of the test and the type of score the test was performed on.

Hypothesis One.--Control class pulse pressure scores toward the four subject matters will be (a) equal, and

(b) neutral.

To test equality, a one-way analysis of variance (Ferguson, 1966:290) was done on the control class *class ratios*, and *class differences, numerical scores*, for the four *word slides*.

To test neutrality, t-tests (Huntsberger, 1961:150) were done comparing the control class *class ratios* and *class differences, numerical scores*, with the population means for neutrality (1 for ratios, and 0 for differences).

Hypothesis Two.--Control class book selection scores toward the four subject matters will be (a) equal and (b) zero.

To test equality, a χ^2 test was performed comparing the observed distribution of control class *proportions* for *each book* with a distribution in which the expected proportion for each book was equal.

To test for being zero, a simple comparison of proportions to zero was made.

In addition, the *proportion* of *S*s selecting *any book* in the *control class* was compared to the similar *proportion* in *all the treatment classes*. This was done by a z-test between proportions (Ferguson, 1966:177).

Hypotheses Three and Four.--Treatment classes' pulse pressure scores toward the four subject matters will not be influenced by (a) classes, (b) subject matter, (c) order of presentation, and (d) media.

To test these influences, the Latin Square ANOVA for Residual Effects (Cochran and Cox, 1957:135-138) was performed on five sets of scores for the *word slides*:

1.	Fifth Grade	Ratios	Numerical Scores
2.	Fourth Grade	Ratios	Numerical Scores
3.	Fourth Grade	Ratios	Proportion of High Scores
4.	Fourth Grade	Differences	Numerical Scores
5.	Fourth Grade	Differences	Proportion of High Scores

The class, subject matter, and media effects were indicated by each individual analysis. The order effects were analyzed by comparing the results of analyses 1 and 2.

Hypotheses Five and Six.--Treatment classes' book selection scores toward the four subject matters will not be influenced by (a) classes, (b) subject matter, (c) order of presentation, and (d) media.

To test these influences, the Latin Square ANOVA for Residual Effects (Cochran and Cox, 1957:135-138) was performed on three sets of *proportions*:

1.	Fourth Grade	Books Selected After Presentations
2.	Fifth Grade	Books Selected After Presentations
3.	Fourth Grade	Books Selected After Testing

The class, subject matter, and media effects were indicated by each individual analysis. The order effects were analyzed by comparing the results of analyses 1 and 2.

In addition, Scheffe's Test for Multiple Comparisons

(Edwards, 1962:154-156) was performed where significant effects were found.

Finally, z-tests (Ferguson, 1966:177) were performed comparing (1) the proportion of Ss selecting books based on each of the presentations with (2) the control class baseline proportion of Ss selecting books.

Hypothesis Seven.--Treatment classes' pulse pressure scores toward the four media will be equal.

To test the equality of these scores, a one-way analysis of variance (Ferguson, 1966:290) was performed between all the individual ratio scores toward each of the media.

In addition a chi-square test was performed comparing the observed distributions of the number of high scores and low scores toward each medium with a distribution in which the expected number of high and low scores for each medium was equal.

The results of the analyses described in this section are presented in the next chapter.

CHAPTER IV

RESULTS

In the first part of this chapter, each experimental hypothesis will be restated. Under the statement of each hypothesis, the results of the analysis of data related to that hypothesis will be presented and discussed. In the second part, the two methodological assumptions will be restated and discussed in light of the data obtained. Finally, the study's proposed taxonomy will be restated and its validity will be discussed.

Hypothesis One

Pulse pressure scores will indicate that preexperimental "satisfaction in response," or interest responses, toward the four subject matters were (a) equal and (b) neutral.

Results

The Control Class' class ratio scores and class difference scores for the four subject matters are presented in Tables 10 and 11.

TABLE 10

Control Class's
CLASS RATIO SCORES
for the Four Subject Matters

m	p	c	r
1.04	.98	1.12	.97

TABLE 11

Control Class's
CLASS DIFFERENCE SCORES
for the Four Subject Matters

m	p	c	r
+.07	+.00	+.32	-.06

Equality.--A one-way analysis of variance (Ferguson, 1966:290) was performed to test for the equality of the ratio scores. The results are shown in Table 12.

TABLE 12

Analysis of Variance
Control Class
Class Ratio Scores

SOURCE	df	MS	F	P
Between	3	.047	1.093	p>.05
Within	40	.043		
Total	43			

$F_{(3,40;.01)}=3.41$

A one-way analysis of variance was also performed to test for the equality of the *difference* scores. The results are shown in Table 13.

TABLE 13

Analysis of Variance
Control Class
Class Difference Scores

SOURCE	df	MS	F	p
Between	3	.30	F<1	p>.05
Within	40	.37		
Total	43			$F_{(3,40;.01)}=3.41$

The analyses of both types of scores yield nonsignificant F's, and therefore the hypothesis of *equality* of the scores is *accepted*.

Neutrality.--Each of the four control class *class ratio scores* was compared by a t-test (Huntsberger, 1961: 150) with the population mean for neutrality, 1.00. The results are presented in Table 14. Each of the four control class *class difference scores* was also compared by a t-test with its population mean for neutrality, 0.00. The results are presented in Table 15. The analyses of all the Control Class scores yield nonsignificant t's, and therefore the hypothesis of all *neutral* scores is *accepted*.

TABLE 14

t-tests
Control Class
Class Ratio Scores
compared with
Neutrality, 1.00

Subject	Score	t-value	p
m	1.04	.2352	p>.01
p	.98	.1478	p>.01
c	1.12	1.1268	p>.01
r	.97	.2349	p>.01

$t_{(10;\ 1\text{-tail};\ .01)}=2.764$

TABLE 15

t-tests
Control Class
Class Difference Scores
Compared with
Neutrality, 0.00

Subject	Score	t-value	p
m	+ .07	.4042	p>.01
p	+ .01	.0081	p>.01
c	+ .32	1.1829	p>.01
r	- .06	.3836	p>.01

$t_{(10;\ 1\text{-tail};\ .01)}=2.764$

Discussion

Since the control class's pulse pressure scores (whether figured by ratios or differences) were all equal, and were equal to the neutral value, two conclusions can be drawn.

First, there was no favoring of one subject matter over the others before the experiment. Thus, despite the fact that the Rocky Mountains are closer to Los Angeles than the other three areas tested, and consequently the *S*s may have had more exposure to them, the preexperimental interest in them was no greater than that in any area.

Second, there was no "satisfaction in response" toward any of the subject matters before the experiment. The subject matters used in this study were *initially affectively neutral* to the *S*s. Thus any *affective responses*, positive or negative, obtained in the treatment classes would have to be *elicited by the treatments* themselves.

Hypothesis Two

Voluntary book selection scores will indicate that preexperimental "preference for a value," or action responses, toward the four subject matters were (a) equal and (b) zero.

Results

The number and proportion of *S*s in the control class (only one set of selection scores was obtained from the control class) selecting each of the four books is given in Table 16.

TABLE 16

Numbers and Proportions
of Control Class's
Book Selection Responses
for the Four Subject Matters

DATA	m	p	c	r	TOTAL
Number	1	1	3	5	10
Proportion	.05	.05	.14	.23	.47

Equality.--A chi-square test was performed to compare the observed number of Ss selecting each book with the expected number of Ss selecting each book if the equality hypothesis were true (cf. Huntsberger, 1961:176). The results of this chi-square test, with an expected value of 2.5 for each book, are presented in Table 17.

TABLE 17

Chi-square Test
Comparing Control Class
Observed Selection Numbers with
Expected Equal Selection Numbers

Subject	Observed	Expected	$\frac{(O-E)^2}{E}$	p
m	1	2.5	.90	
p	1	2.5	.90	
c	3	2.5	.10	
r	5	2.5	2.50	
TOTAL	10	10.0	$4.40=\chi^2$	$p>.01$

$\chi^2(3;.01)=9.837$

Since the chi-square test yields a nonsignificant chi-square, the hypothesis of equality of scores is accepted.

Zero. Ten students out of the twenty-two in the control class selected books. Therefore the hypothesis that zero books would be selected must be rejected.

However, the purpose for this hypothesis was really to provide a baseline figure for book selections, against which the selection responses of the treatment classes could be compared. Therefore, it was decided that what was crucial for this hypothesis was not the zero figure, but rather a proportion of treatment Ss selecting books that was significantly greater than the proportion of control Ss selecting books.

Therefore, the proportion of all treatment Ss selecting books (the after-presentation selections were used) was calculated, as shown in Table 18.

TABLE 18

Calculation of Proportion of All Treatment Ss Selecting Books

Class	# of Ss	# Selecting Books	Proportion
41	22	14	.63
42	20	15	.75
43	22	18	.83
44	22	18	.83
51	23	12	.52
52	27	22	.82
53	26	19	.72
54	27	21	.79
TOTAL	189	139	Mean Prop. = .74

This treatment class proportion of .74 was compared to the control class proportion of .47 using a z-test (Ferguson, 1966:177). While $z_{(.01)}=2.58$, the z obtained from the test between the proportions was 2.63; thus, $p<.01$ for the obtained z-score. The proportion of Ss in the control class selecting books, then, is significantly less than the proportion of the Ss in the treatment classes selecting books.

Discussion

Since the control class's book selection proportions were all equal, and, while they were not equal to zero, they were significantly lower than the treatment classes' proportions, two conclusions can be drawn.

Though there was some preexperimental "preference for a value" toward the subject matters, the preexperimental effect was (1) equal for all subject matters, so that it affected all treatment scores equally, and (2) small, so that it could not account for all the selection scores in the treatment classes.

Thus, whatever differences were found in the treatment groups' book selection scores were elicited by the treatments themselves.

Hypotheses Three and Four

Pulse pressure scores will indicate that "satisfaction in response" toward the four subject matters was not affected by (a) classes, (b) subject matter, or (c) order of presentation.

Pulse pressure scores will indicate that "satisfaction in response" toward the four subject matters was affected (a) by media, (b) in a hierarchy: F>S>T>TCH.

Results

Tests of these hypotheses were made on five different sets of scores, as indicated in Chapter III. The five sets of scores are presented in Tables 19, 20, 21, 22, and 23.

A Latin Square ANOVA for Residual Effects (Cochran and Cox, 1957:135-138) was performed on each of these five sets of data. The results of these five analyses are shown in Tables 24, 25, 26, 27, and 28.

Classes.--In all five analyses the class effects are measured by the Columns MS, and in all five analyses, the F associated with Columns is nonsignificant. Thus, the hypothesis of no class effects is accepted.

Subject Matter.--The subject matter effects are measured by Direct Adjusted MS in Table 24 and by Rows MS in Tables 25, 26, 27, and 28. In each analysis, the F associated with the appropriate MS is nonsignificant. Thus, the hypothesis of no subject matter effects is accepted.

Order of Presentation.--Order effects are measured in two ways. Within each analysis, they are measured by the Carry-Over effects, which is the Residual Adjusted MS. In

TABLE 19

Fifth-Grade Ratios, Number Scores

		Classes					Subject Matter
		51	52	53	54	TOTAL	TREATMENT TOTAL
	T	m .98	p .99	c 1.10	r 1.01	4.08	m 3.92
	TCH	p 1.03	c .96	r 1.04	m 1.04	3.91	p 4.03
MEDIA	F	r 1.03	m 1.08	p 1.00	c 1.00	4.11	c 4.02
	S	c .96	r .98	m .98	p .98	3.93	r 4.06
	TOTAL	4.00	4.01	4.12	3.90		

TABLE 20

Fourth-Grade Ratios, Number Scores

		CLASSES					MEDIA
		41	42	43	44	TOTAL	TREATMENT TOTAL
SUBJECT MATTER	m	F .96	S 1.05	T 1.07	TCH .93	4.01	F 4.04
	p	S 1.06	T 1.02	TCH 1.05	F 1.03	4.16	S 4.22
	c	TCH 1.08	F 1.01	S 1.08	T 1.02	5.19	TCH 4.07
	r	T .99	TCH 1.01	F 1.04	S 1.03	4.07	T 4.10
TOTAL		4.09	4.09	4.24	4.01		

TABLE 21

Fourth-Grade Ratios, Proportions of Highs

		CLASSES					MEDIA
		41	42	43	44	TOTAL	TREATMENT TOTAL
SUBJECT MATTER	m	F .18	S .22	T .50	TCH .16	1.06	F .67
	p	S .35	T .06	TCH .28	F .21	.90	S 1.17
	c	TCH .41	F .17	S .39	T .21	1.18	TCH .96
	r	T .41	TCH .11	F .11	S .21	.84	T 1.18
	TOTAL	1.35	.56	1.28	.79		

TABLE 22

Fourth-Grade Differences, Number Scores

		CLASSES					MEDIA
		41	42	43	44	TOTAL	TREATMENT TOTAL
SUBJECT MATTER	m	F .04	S .15	T .20	TCH .12	.51	F .55
	p	S .40	T .12	TCH .24	F .07	.83	S .86
	c	TCH .32	F .13	S .05	T -.01	.49	TCH .70
	r	T .37	TCH .02	F .31	S .26	.96	T .68
	TOTAL	1.13	.42	.80	.44		

TABLE 23

Fourth-Grade Differences, Proportions of Highs

		CLASSES					MEDIA
		41	42	43	44	TOTAL	TREATMENT TOTAL
SUBJECT MATTER	m	F .24	S .33	T .50	TCH .16	1.23	F .89
	p	S .41	T .22	TCH .28	F .26	1.17	S 1.44
	c	TCH .41	F .11	S .44	T .21	1.17	TCH 1.02
	r	T .53	TCH .17	F .28	S .26	1.24	T 1.46
	TOTAL	1.59	.83	1.50	.89		

TABLE 24

Analysis of Variance
Fifth-Grade Ratios, Number Scores

VARIABLE	SOURCE	df	MS	F	p
Classes	Columns	3	.0020	F<1	p>.05
Media	Rows	3	.0026	F<1	p>.05
	Direct-Unadjusted	3			
Carry-Over	Residual-Adjusted	3	.0055	F<1	p>.05
	Residual-Unadj.	3			
Subj. Matter	Direct-Adjusted	3	.0008	F<1	p>.05
	Error	3	.0187		
	TOTAL	15			

$F_{(3,3;.05)}=9.28$

TABLE 25

Analysis of Variance
Fourth-Grade Ratios, Number Scores

VARIABLE	SOURCE	df	MS	F	p
Classes	Columns	3	.0023	$F<1$	
Subj. Matter	Rows	3	.0017	$F<1$	
	Direct-Unadjusted	3			$p>.05$
Carry-Over	Residual-Adjusted	3	.0003	$F<1$	
	Residual-Unadj.	3			
Media	Direct-Adjusted	3	.0018	$F<1$	
	Error	3	.0027		
	TOTAL	15			

$F_{(3,3;.05)}=9.28$

TABLE 26

Analysis of Variance
Fourth-Grade Ratios, Proportions of Highs

VARIABLE	SOURCE	df	MS	F	p
Classes	Columns	3	.0366	2.2048	
Subj. Matter	Rows	3	.0060	F<1	
	Direct-Unadjusted	3			p>.05
Carry-Over	Residual-Adjusted	3	.0080	F<1	
	Residual-Unadj.	3			
Media	Direct-Adjusted	3	.0138	F<1	
	Error	3	.0166		
	TOTAL	15			

$F_{(3,3;.05)}=9.28$

TABLE 27

Analysis of Variance
Fourth-Grade Differences, Number Scores

VARIABLE	SOURCE	df	MS	F	p
Classes	Columns	3	.0284	F<2	
Subj. Matter	Rows	3	.0137	F<1	
	Direct-Unadjusted	3			p>.05
Carry-Over	Residual-Adjusted	3	.0137	F<1	
	Residual-Unadj.	3			
Media	Direct-Adjusted	3	.0078	F<1	
	Error	3	.0241		
	TOTAL	15			

$F_{(3,3;.05)}=9.28$

TABLE 28

Analysis of Variance
Fourth-Grade Differences, Proportions of Highs

VARIABLE	SOURCE	df	MS	F	p
Classes	Columns	3	.0396	4.5517	
Subj. Matter	Rows	3	.0004	F<1	
	Direct-Unadjusted	3			p>.05
Carry-Over	Residual-Adjusted	3	.0076	F<1	
	Residual-Unadj.	3			
Media	Direct-Adjusted	3	.0184	2.1149	
	Error	3	.0087		
	TOTAL	15			

$F_{(3,3;.05)}=9.28$

all five analyses, the F associated with the Residual MS is nonsignificant. Therefore, there was no significant carry-over effect from one treatment to another. Between analyses, order effects are measured by comparing the results of the two different ordering patterns used, one for the fourth grade and the other for the fifth grade. Comparing the results obtained from the fifth-grade analysis (Table 25) with those obtained from the similar fourth-grade analysis (Table 26), it can be seen that there is no difference in the results obtained. Therefore, there does not appear to be an order effect, either of media or of subject matter, operating in this study. Thus, the hypothesis of no order effects is accepted.

Media.--The media effects are measured by the Rows MS in Table 24 and the Direct Adjusted MS in Tables 25, 26, 27, and 28. In each analysis, the F associated with the appropriate MS is nonsignificant. Thus, the hypothesis of media effects in a hierarchy is rejected.

Discussion

While the results which indicated no class, subject matter, or order of presentation effects were expected, the results which indicated no media effects were the opposite of what had been hypothesized on the basis of the research and theory presented in Chapter II. This finding of no significant media effects raised several questions.

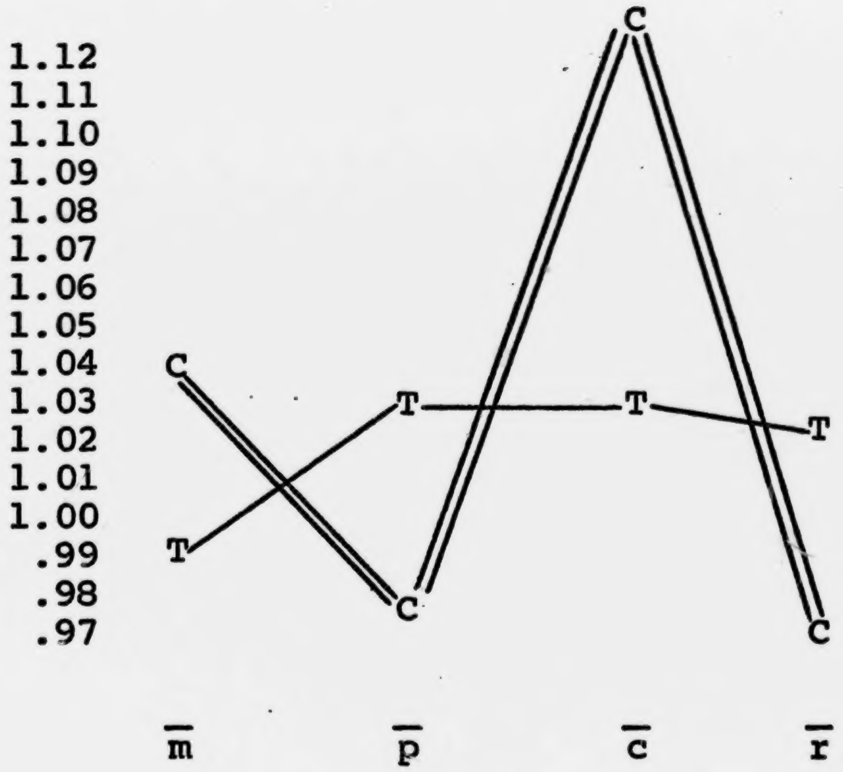
Neutrality.--The first question was "If the affective responses to the four subject matters elicited by media are all equal, at what level are they equal; i.e., are they all positive, all negative, or all neutral?" The answer to this question is important because it determines how the result must be interpreted.

To test for the level of affect indicated by the pulse pressure scores, the scores for all the treatment classes were combined and were compared with the control class, whose pulse scores have already (Hypothesis 1) been shown to be neutral. The data for the comparison are presented in Table 29, and the comparison is shown graphically in Figure 2. The data indicated that the treatment classes showed less variation from the neutral point than does the control class. Since the treatment classes showed less variation from neutrality than the control class, and since the control class's scores were neutral, it can be concluded that the treatment class "satisfaction in response" toward the four subject matters, as measured by pulse pressure, was

TABLE 29

Comparison of Treatment Classes' and Control Class's Pulse Pressure Scores toward the Four Subject Matters

CLASSES	m	p	c	r	RANGE
Treatment	.99	1.03	1.03	1.02	.04
Control	1.04	.98	1.12	.97	.15



T=Treatment Class Scores
C=Control Class Scores
m, c, p, r=4 subject matters

Fig. 2.--Comparison of Treatment Classes' and Control Class's Pulse Pressure Scores Toward the Four Subject Matters.

neutral.

Reasons.--The second question was "Given that the affective responses were all neutral, why were they neutral?" Logically, there are three possible answers to this question: (1) the media presentations caused no positive affective responses, and therefore the pulse pressure responses to the test stimuli were neutral; (2) the media presentations did cause positive affective responses, but these responses were not, for some reason, indicated by the pulse pressure scores; (3) the media presentations did cause positive affective responses, but the pulse pressure responses obtained were to the test slides instead of to the presentation, and since the test slides were relatively neutral in affect, the pulse pressure scores were neutral.

While the first answer is the most obvious, it seems the least likely. This judgment is based on both the research and theory presented in Chapter II, which indicated that media can indeed elicit positive affect toward subject matter, and on the findings of this study regarding book selection responses (discussed in the next section), which indicated that media do elicit action responses, responses which, according to Krathwohl (1964), have positive affect as a prerequisite.

A combination of answers 2 and 3 seems to provide a more likely explanation, especially in light of the results obtained in the newest study by Bergum and Lehr (unpublished; details obtained in personal conversation with Dr. Lehr) related to the sensitivity of capillary pulse pressure as a measure of "satisfaction in response." Two results are pertinent to the findings of this study.

The key result is that when pulse pressure data was collected during the presentation, the pulse scores indicated the affective value of the presentation. When pulse pressure data was collected after the presentation was over, however, the pulse scores did not indicate the affective value of the presentation.

A possible explanation of this finding is another result, obtained independently, concerning the sensitivity of pulse pressure. It appears that pulse pressure is not as sensitive a measure of affective response as was originally thought, and the stimulus materials must be rather extreme in affect to have an effect on pulse pressure.

Thus, if pulse pressure measurements are not taken until after the presentation is over (as was done in this study to eliminate experimental motivation) the affect generated by the presentation begins to dissipate and is further contaminated by the neutral affect from the test stimuli. While positive "satisfaction in response" to the presentation still exists, then, it is not extreme enough to have an effect on pulse pressure responses.

Conclusion.--Therefore the hypothesis that media would differentially affect pulse pressure scores toward the four subject matters should not really be rejected. The conclusion, instead, should be that the methodology used in this experiment to obtain the pulse pressure scores does not provide valid data for testing this hypothesis. This conclusion will be amplified in the discussion of Assumption One.

Hypotheses Five and Six

Book selection scores will indicate that "preference for a value" toward the four subject matters was not affected by (a) classes, (b) subject matter, or (c) order of presentation.

Book selection scores will indicate that "preference for a value" toward the four subject matters was affected (a) by media, (b) in a hierarchy: F>>S=T>>TCH.

Results

Tests of these hypotheses were made on three different sets of scores, as indicated in Chapter III. The three sets of scores are presented in Tables 30, 31, and 32.

A Latin Square ANOVA for Residual Effects (Cochran and Cox, 1957:135-138) was performed on each of these three sets of data. The results of these three analyses are shown in Tables 33, 34, and 35.

Classes.--In all three analyses, the class effects

TABLE 30

Fourth-Grade Proportions of Books Selected after Presentations

		CLASSES					MEDIA
		41	42	43	44	TOTAL	TREATMENT TOTAL
SUBJECT MATTER	m	F .27	S .00	T .05	TCH .09	.41	F 1.37
	p	S .00	T .10	TCH .05	F .32	.47	S .37
	c	TCH .00	F .10	S .05	T .09	.24	TCH .69
	r	T .36	TCH .55	F .68	S .32	1.91	T .60
TOTAL		.63	.75	.83	.82		

TABLE 31

Fifth-Grade Proportions of Books Selected after Presentations

		CLASSES					SUBJECT MATTER
		51	52	53	54	TOTAL	TREATMENT TOTAL
MEDIA	T	m .04	p .00	c .15	p .19	.38	m .75
	TCH	p .09	c .04	r .23	m .15	.51	p .32
	F	r .35	m .41	p .19	c .41	1.36	c .64
	S	c .04	r .37	m .15	p .04	.60	r 1.14
	TOTAL	.52	.82	.72	.79		

TABLE 32

Fourth-Grade Proportions of Books Selected after Testing

		CLASSES					MEDIA
		41	42	43	44	TOTAL	TREATMENT TOTAL
SUBJECT MATTER	m	F .23	S .00	T .05	TCH .09	.37	F 1.69
	p	S .14	T .15	TCH .05	F .36	.70	S .37
	c	TCH .00	F .25	S .05	T .09	.39	TCH .54
	r	T .36	TCH .40	F .85	S .18	1.79	T 1.64
	TOTAL	.73	.80	1.00	.72		

TABLE 33

Analysis of Variance
Fourth-Grade Proportions of Books Selected after Presentations

VARIABLE	SOURCE	df	MS	F	p
Classes	Columns	3	.0021	<1	p>.05
Subj. Matter	Rows	3	.1500	50.00*	p<.05
	Direct-Unadjusted	3			
Carry-Over	Residual-Adjusted	3	.0127	4.23	p>.05
	Residual-Unadj.	3			
Media	Direct-Adjusted	3	.0502	16.73*	p<.05
	Error	3	.0030		
	TOTAL	15			

$F_{(3,3;.05)}=9.28$

*Significant at .05 level of confidence.

TABLE 34

Analysis of Variance
Fifth-Grade Proportions of Books Selected after Presentations

VARIABLE	SOURCE	df	MS	F	p
Classes	Columns	3	.0045	<1	p>.05
Media	Rows	3	.0486	9.72*	p<.05
	Direct-Unadjusted	3			
Carry-Over	Residual-Adjusted	3	.0140	2.80	p>.05
	Residual-Unadj.	3			
Subj. Matter	Direct-Adjusted	3	.0290	5.80	p>.05
	Error	3	.0050		
	TOTAL	15			

$F_{(3,3;.05)}=9.28$

*Significant at .05 level of confidence.

TABLE 35

Analysis of Variance
Fourth-Grade Proportions of Books Selected after Testing

VARIABLE	SOURCE	df	MS	F	p
Classes	Columns	3	.0042	<1	p>.05
Subj. Matter	Rows	3	.1119	14.7237*	p<.05
	Direct-Unadjusted	3			
Carry-Over	Residual-Adjusted	3	.0192	2.5263	p>.05
	Residual-Unadj.	3			
Media	Direct-Adjusted	3	.0913	12.0132*	p<.05
	Error	3	.0076		
	TOTAL	15			

$F_{(3,3;.05)}=9.28$

*Significant at .05 level of confidence.

are measured by the Columns MS, and, in all three analyses, the F associated with Columns is nonsignificant. Thus, the hypothesis of no class effects is accepted.

Subject Matter.--The subject matter effects are measured by the Rows MS in Tables 33 and 35, and by the Direct Adjusted MS in Table 34. While the analysis for the fifth-grade scores (Table 34) indicates a nonsignificant F for Direct MS, the analyses for the fourth-grade scores (Tables 33 and 35) show significant F's for the Row, or Subject Matter, effects.

To find out which scores caused the significant effects, Scheffe's Test for Multiple Comparisons (Edwards, 1962:154-156) was performed on both sets of fourth-grade Row Totals. The results of these tests are presented in Tables 36 and 37.

Considering the conservative nature of this test (so conservative that Scheffe recommends setting $\alpha = .10$) these differences are highly significant. These Scheffe tests indicate that significantly more fourth-grade Ss selected the Rocky Mountain books than selected any one of the other books, or all of the other books combined.

Thus, the hypothesis of no subject matter effects must be accepted for the fifth grade, but rejected for the fourth grade, where Ss selected significantly more Rocky Mountain books.

TABLE 36

Scheffe Test for
Subject Matter Comparisons
Fourth-Grade Proportions of Books
Selected after Presentations

COMPARISONS	F	p
r--m	93.76	p<.01*
r--p	86.26	p<.01*
r--c	116.26	p<.01*
m--p	.43	p>.01
m--c	1.26	p>.01
p--c	3.33	p>.01
r--m+p+c	147.56	p<.01*

$F^{1}_{(3,12;.01)}=17.85$

*Significant at the .01 level of confidence

TABLE 37

Scheffe Test for
Subject Matter Comparisons
Fourth-Grade Proportions of Books
Selected after Testing

COMPARISONS	F	p
r--m	33.22	p<.01*
r--p	18.56	p<.01*
r--c	32.24	p<.01*
m--p	1.84	p>.01
m--c	0.00	p>.01
p--c	1.71	p>.01
r--m+p+c	41.91	p<.01*

$F^{1}_{(3,12;.01)}=17.85$

*Significant at the .01 level of confidence.

Order of Presentation.--The first measure of order effects, the carry-over or Residual MS within each analysis, has a nonsignificant F associated with it in all three analyses. Therefore, there were, again, no significant carryover effects from one treatment to another. The effects of overall order on the results, obtained by comparing the fourth-grade analysis (Table 33) with the fifth-grade analysis (Table 34), are less clear. The results of the fourth-grade analysis differ from those of fifth-grade analysis; the fourth grade shows significant subject matter and media effects, while the fifth grade shows only significant media effects. Thus, the findings regarding order effects are ambiguous, and will be examined further in the discussion of these results.

Media.--The media effects are measured by the Direct Adjusted MS in Tables 33 and 35, and by the Rows MS in Table 34. In all three analyses, the F associated with the appropriate MS is significant, indicating that the presentation mode significantly affected book selection scores.

To determine which media caused the significant effects, Scheffe's Test for Multiple Comparisons was performed on all three sets of media totals. The results of these tests are presented in Tables 38, 39, and 40.

Considering the conservative nature of the Scheffe test (so conservative that Scheffe recommends setting α = .10), these differences are highly significant. These

TABLE 38

Scheffe Test for Media Comparisons
Fourth-Grade Proportions of Books
Selected after Presentations

COMPARISONS	F	p
F--S	41.67	$p<.01$*
F--TCH	19.17	$p<.01$*
F--T	24.60	$p<.01$*
S--TCH	4.17	$p>.01$
S--T	2.10	$p>.01$
TCH--T	.43	$p>.01$
F--S+TCH+T	41.67	$p<.01$*

$F^1_{(3,12;.01)}=17.85$

*Significant at the .01 level of confidence.

TABLE 39

Scheffe Test for Media Comparisons
Fifth-Grade Proportions of Books
Selected after Presentations

COMPARISONS	F	p
F--S	18.50	$p<.01$*
F--TCH	20.00	$p<.01$*
F--T	24.00	$p<.01$*
S--TCH	.26	$p>.01$
S--T	1.26	$p>.01$
TCH--T	.50	$p>.01$
F--S+TCH+T	27.96	$p<.01$*

$F^1_{(3,12;.01)}=17.85$

*Significant at the .01 level of confidence.

TABLE 40

Scheffe Test for Media Comparisons Fourth-Grade Proportions of Books Selected after Testing

COMPARISONS	F	p
F--S	28.62	$p<.01$*
F--TCH	21.71	$p<.01$*
F--T	18.09	$p<.01$*
S--TCH	.50	$p>.01$
S--T	1.16	$p>.01$
TCH--T	.17	$p>.01$
F--S+TCH+T	33.96	$p<.01$*

$F^1_{(3,12;.01)}=17.85$

*Significant at the .01 level of confidence.

Scheffe tests indicate that significantly more Ss selected books based on having seen a Film than based on any one of the other presentations or than based on all of the presentations combined.

Thus far, the Analyses of Variance and the Scheffe tests have led to the conclusion that Film elicited significantly more book selection responses than any one of, or all of, the other presentations. However, these tests only compare the presentation modes to each other, and only indicate the relative effectiveness of each of the modes in eliciting "preference for a value." Before useful conclusions can be drawn from this data, it is necessary to know the absolute effectiveness of each of the modes in eliciting "preference for a value."

This absolute effectiveness must be obtained not by comparing the modes to each other, but rather by comparing each of the modes to a baseline value. The baseline is the proportion of book selection responses that would have occurred even without the influence of the mode. If the amount of "preference for a value" elicited by the mode is greater than this baseline figure, then the mode is effective in eliciting "preference." If it is not, then, even if that mode is greater than all the other modes, it is still not effective in eliciting "preference."

The baseline figure in this study is not zero. It is, instead, the percentage of Ss in the Control Class who selected books. This base percentage, as indicated in Table 16, is 47%. Since there are four media contributing to the total base percentage, the base percentage for each medium is determined by dividing this figure by 4. Thus, if each medium elicits book selection responses from 11.75% of the Ss, it is performing exactly at the baseline figure; i.e., it is eliciting the same number of responses as would have occurred without its influence. The medium must elicit book selection responses from more than 11.75% of the S to be considered effective in eliciting "preference."

To test this effectiveness, a z-test (Ferguson, 1966:177) was used to compare the proportion of Ss selecting books as a result of exposure to each of the presentations with the proportion of Ss in the Control class that represents the baseline figure. The results of these tests are presented in Table 41.

TABLE 41

z-Tests Comparing Books Selections Elicited by Each Medium with Baseline Proportion

MEDIA	MEDIA PROPORTION (TREATMENT S)	BASELINE PROPORTION (CONTROL S)	z	p
FILM	.35	.1175	2.21	$p<.05$*
SLIDES	.12	.1175	.03	$p>.05$
TAPE	.12	.1175	.03	$p>.05$
TEACHER	.15	.1175	.41	$p>.05$

$z_{(.05)}=1.96$

*Significant at the .05 level of confidence.

The z-score for Film is the only score that is significant. This indicates that Film is the only presentation mode that elicited more book selections than would have occurred without the presentations. Therefore, film is the only medium that was effective in eliciting "preference for a value."

Thus, in conclusion, the hypothesis of media effects in eliciting "preference for a value" is accepted. The hierarchy for media effects indicates that not only is Film greater than any one of, or all of, the other media in eliciting "preference," but also it is the only medium that can be said to have elicited "preference for a value." Thus, the hierarchy hypothesis is accepted, and F>>>S=T=TCH=O.

Discussion

Order Effects.--While no carryover effects were obtained in any of the three analyses, possible differences in the effects of different overall orders were indicated by the differences in results in the fourth- and fifth-grade analyses.

One possible explanation of the difference is that the different orders did have different effects. In the fourth grade, as shown in Table 6, all classes received the presentation on the Rocky Mountains last, and here, the Rocky Mountains did elicit more book selections than any of the other subject matters. In the fifth grade, on the other hand, the presentation on the Rocky Mountains occurred in different sequential positions, and here, the Rocky Mountains did not elicit more book selections. It is possible, then, that the law of recency was operating, and the Ss selected books on whatever subject matter they were presented last. Since all fourth grades saw the Rocky Mountains last, they all selected it, while since the last presentation for the fifth grade was different for each class, this recency effect was obscured by being equally distributed.

This position is a tenable one, and could be acceptable were it not for the pattern of the media effects. The media effects do not show a recency effect. If recency were operating, then the fifth grade, in which all classes received the media in the same order, would show a tendency to select books based on the last presentation they received, regardless of its subject matter. This did not happen, since the last presentation was Slides and the media effects indicated that the Film was the medium that elicited the greater number of book selections.

The lack of order effects with media, combined with the lack of order effects in the pulse pressure analyses already discussed, tend to indicate, although not prove, that order effects do not provide the best explanation for the difference between the fourth- and fifth-grade analyses.

An alternative hypothesis concerns familiarity. As was mentioned earlier, it is probable that, before the experiment, the Ss were more familiar with the Rocky Mountain area than with any of the other areas discussed. It is possible that fourth graders, being younger and less mature, know very little about the other areas, and tended to select books about the area they felt most comfortable about, the Rocky Mountains. The fifth graders, on the other hand, being older, more knowledgeable and perhaps more adventuresome, know more about the other areas and were more willing to "take a chance" and find out about one of the other areas.

Since a doubt exists about whether it was actually order effects that were operating to cause the difference between the fourth-grade subject matter effects and the fifth-grade subject matter effects, the following conclusion regarding the hypothesis of no order effects must be drawn.

The hypothesis of no order effects can be rejected in terms of an influence on media effects. No conclusion can be drawn concerning the influence of order effects on subject matter effects.

Timing of the Test.--One of the problems that is found in classroom research when the test is removed in time from the treatment is the intersubject interaction during the intervening time. In this study, for example, it was possible that during the time between the presentations and the testing (which varied from 30 minutes to 5 hours) that the subjects' attitudes would be influenced by conversations with classmates, and especially with opinion leaders in the class.

In light of this possible problem, it is interesting to compare the book selection responses made by the fourth-grade S immediately after the presentations with those made after the testing. The analyses of both of these sets of data (Tables 33 and 35) provide exactly the same results. Thus, overall, the book selection responses made from 30 minutes to five hours after the presentations were the same as those made immediately after the presentations.

It appears, then, that whatever "preference for a value" was elicited by the presentations remained despite possible contaminating influences from the children's desire to "select the book that all the other kids picked." This provides an indication, though not a proof, that the affective responses elicited by the presentation, at least in terms of action responses, were quite strong.

Media Effects.--The finding that Film caused more action responses than the other mediated and nonmediated instructional methods and is the only method that elicited "preference for a value" is perhaps the most significant finding of the study.

It supports the results of Wood and Freeman (1929), Knowlton and Tilton (1929), and Potthoff, Larson, and Patterson (1940), which indicated that Films could motivate actions toward subject matter, and the results of Rulon (1933) and Reid (1940), which indicated that recordings or radio (the equivalent of Tape in this study) could not motivate such actions. Further, it contradicts May's and Lumsdaine's (1958) findings that Film did not motivate actions.

These results are important in the interpretation of the pulse pressure data too. According to Krathwohl, "satisfaction in response" is a prerequisite to "preference for a value." The ability of all the instructional methods, and especially Film, to elicit the latter response indicates that they also probably elicited the former. This lends support to the theory that the "no differences" obtained from the pulse pressure scores were an artifact of the measurement device and not the lack of affective response.

The implications of the superiority of Film in eliciting "preference for a value" will be discussed in Chapter V.

Hypothesis Seven

Pulse pressure scores will indicate that "satisfaction in response," or interest responses, toward the four media form a hierarchy: F>S>T>TCH.

Results

The means of all Ss' individual ratio scores toward each of the four presentation modes are presented in Table 42.

TABLE 42

Means of All Ss' Individual Ratio Scores toward the Four Presentation Modes

T	TCH	F	S
1.00	1.01	1.02	1.04

A one-way analysis of variance (Ferguson, 1966:290) was performed to test for the equality of these means. The results are shown in Table 43. This analysis of raw data yields a nonsignificant F.

However, this data was also changed into nominal data. This data in Table 8 (page 97) provides another and possibly more useful way of comparing the "satisfaction in response" toward the four media. From the table it appears

TABLE 43

Analysis of Variance
Individual Ratio Scores
Toward the Four Presentation Modes

SOURCE	df	MS	F	p
Between	3	.02	1.00	p>.05
Within	284	.02		
Total	287			

$F_{(3,284;.05)}=2.65$

that while the means are all equal, the distributions for the four media are different. It seems that there are more high scores for Film, and more low scores for Tape and Teacher. To test this, chi-square tests were performed comparing both the number of highs and the number of lows observed for each medium with the number of highs and lows that would be expected if they were distributed equally among the media. These chi-square tests are presented in Tables 44 and 45. Both of these tests yield significant chi-square.

They indicate that the affective responses to the four media are not the same, as indicated by the ANOVA, but are different in terms of the distribution of High and Low Scores. Film has the greatest number of Highs, and the smallest number of Lows, indicating that "satisfaction in response" was highest for Film. Tape has the smallest num-

TABLE 44

Chi-Square Test Comparing Distribution of Number of High Scores toward the Four Media with Expected Equal Distribution

MEDIA	OBSERVED	EXPECTED	$\frac{(O-E)^2}{E}$	p
Film	27	17.5	5.16	
Slides	17	17.5	.01	
Tape	10	17.5	3.21	
Teacher	16	17.5	.13	
TOTAL	70	70.0	$8.51 = \chi^2$	$p<.05$

$\chi^2_{(3;.05)}=7.82$

TABLE 45

Chi-Square Test Comparing Distribution of Number of Low Scores toward the Four Media with Expected Equal Distribution

MEDIA	OBSERVED	EXPECTED	$\frac{(O-E)^2}{E}$	p
Film	10	18.5	3.91	
Slides	16	18.5	.34	
Tape	22	18.5	.66	
Teacher	26	18.5	3.04	
TOTAL	74	74.0	$7.95=\chi^2$	$p<.05$

$\chi^2_{(3;.05)}=7.82$

ber of Highs and one of the greatest numbers of Lows, indicating that "satisfaction in response" was lowest for Tape. The comparison and rating of the attitudes toward the four media can be made more specific than this, however, by subtracting the Number of Lows from the Number of Highs. The differences obtained indicate the "Net Number of Highs," and this figure can be used as an indicator of "satisfaction in response." The difference in scores are: FILM, 17; SLIDES, 1; TEACHER, -10; TAPE, -12. From this comparison, the following hierarchy of "Satisfaction in Response" toward media can be constructed: F>S>TCH>T. In addition, the comparison indicates that Film was the only medium that had a high positive "Net Number of Highs"; therefore, it is the only medium that can be said to effectively elicit positive attitudes toward itself.

Thus, the hypothesis that satisfaction in response toward the four media would be different and form a hierarchy is accepted. The hypothesized hierarchy must be altered slightly to be: F>S>TCH>T. Further, within the hierarchy, only film elicited positive attitudes, or "satisfaction in response," to itself.

Discussion

This result, or at least the part of the result pertaining to film, is in agreement with the studies cited in Table 2, which indicated that media, films and television, can elicit positive attitudes toward themselves.

The most interesting and important aspect of this result is that it was obtained with capillary pulse pressure scores. In the discussion of the results of Hypotheses Three and Four, it was shown that in order for pulse pressure to indicate affective states, they had to be extremely intense, and this was found not to be true at the time of testing for subject matter. However, the positive attitudes toward the media *were intense enough* to affect pulse pressure, especially in the case of film.

It seems clear, in the light of the subject matter results, that these intense affective responses toward film were not generated by this experiment alone. They are based on previous experiences with films, either educational or, more probably, entertainment films. And these previous attitudes, as indicated by the definitions in Chapter II, generalize to other situations in which film is involved.

The apparent intensity and generalizability of the positive attitudes, or "satisfaction in response," toward film seem to make *film an excellent* "*referent object*" in Edling's (1963) attitude change paradigm. Further, film is important for Wallington's (1968) "passive student" who "will attend only if the vehicle is interesting and warrants attention" (p. 2).

Further implications of the superiority of film for eliciting "satisfaction in response" toward itself will be discussed in Chapter V.

Assumption One

Capillary pulse pressure will (a) be a valid measure of "satisfaction in response" and (b) yield the same results when analyzed by several different methods.

Results

Validity.--The acceptance or rejection of this part of the assumption is based on the results of the other hypotheses concerned with pulse pressure scores. In the analyses for Hypothesis One, pulse pressure indicated that preexperimental attitudes were equal and neutral. Hypothesis Three analyses indicated that stimulus materials must be extreme in affect in order to elicit pulse pressure responses, and that perhaps a short amount of time in between the stimulus and the testing will allow enough of the affect to wear off so that no pulse pressure effects will be recorded. The pulse pressure scores in the analyses for Hypothesis Seven did discriminate affective responses toward the presentation modes, but only after several methods of analysis were employed.

These results indicate that capillary pulse pressure may be a valid measure of "satisfaction in response" only in certain limited situations. Since Bergum's and Lehr's procedure of testing during the presentations was not used in this study, no conclusions can be drawn about the validity of pulse pressure under those circumstances. However, based on the results of this study, it does seem that pulse pressure is not a valid measure of "satisfaction in response" when testing occurs after the presentation.

Thus, in terms of the conditions of this study, the hypothesis concerning the validity of pulse pressure must be rejected with the qualifications concerning timing of the testing procedure.

Methods of Analysis.--The validity of this part of the assumption is based on the equivalence of the results of the analyses employing all five different methods of analyzing pulse pressure scores:

1. Class Raw Scores
2. Ratios, Numerical Scores
3. Ratios, Proportion of High Scores
4. Differences, Numerical Scores
5. Differences, Proportion of High Scores.

Hypotheses Three and Four were analyzed using four types of scores, numbers 2 through 5 above (see Tables 24, 25, 26, 27, 28). The results of all these analyses were equivalent, and therefore it can be concluded that Methods 2 through 5 of analyzing pulse pressure score yield the same results.

Method number 1, however, presents a unique problem. Capillary pulse pressure is session sensitive (see discussion in Chapter III) and as a result raw scores, according to Bergum and Lehr, tend to increase systematically as a function of trials. The data obtained in this experiment were examined to see if this systematic increase occurred. The class raw scores for each of the fourth-grade classes for each of the four *word slides*, in the order they were presented, are shown in Table 46.

TABLE 46

Class Raw Scores for Fourth-Grade Classes for the Four *Word Slides*

Test Slides in Order	41	42	43	44
m	8.37	7.25	7.91	7.39
p	8.76	7.54	7.95	8.21
c	9.03	7.67	8.34	8.37
r	9.30	8.00	8.41	9.07

By looking down the columns of Table 46 it will be noted that in each *column*, the scores increase with each test slide. The scores for the first slide are, in each class, the smallest, and the scores for the last slide are the largest. This supports Bergum's and Lehr's (1966b) finding that pulse scores rise as the test session continues.

This result indicates that a *different pattern* of scores is obtained from *raw* scores than is obtained from *ratio* or *difference* scores.

Thus, the hypothesis that the *same results* would be found when pulse pressure was analyzed by several different methods must be *qualified* to include only *ratio* scores and *difference* scores, whether numerical or proportions of highs, but to exclude raw scores.

Discussion

The finding that pulse pressure is not a valid measure of "satisfaction in response" if there is time between the stimulus and the testing severely limits the utility of pulse pressure.

It still may be useful, as Bergum, Lehr, and Dooley (1967) suggest, to "evaluate the motivational-affective value of educational materials, both overall and in terms of specific items, during their developmental phases" (p. 10).

It is not useful as a measure of "satisfaction in response" in research in which it is desired not to present and test at the same time because of experimental motivation or logistical constraints, or in research in which it is desired to test retention of "satisfaction in response."

However, the results of this study indicate that pulse pressure may be able to indicate the retention of something stronger than "satisfaction in response." If a long period of time intervenes between the presentation of the stimulus and the testing of pulse pressure, and if after this time an affective response extreme enough to have an effect on pulse pressure still exists, then it seems that more than just a simple "emotional response" is involved. In this study, for example, it seemed that the extreme amount of "satisfaction in response" that film elicited toward itself was not the result of the experimental materials alone; it involved some previous positive affective responses toward film which were re-elicited by this situation.

An affective response which has existed for so long a period of time and is so strong will, in all probability, have had some action caused by it. For example, a student who has an extremely negative emotional response to a particular class may eventually decide to skip that class; a student who has a strong positive emotional response toward film may eventually go to the movies on his own. Thus, an affective response that starts out as "satisfaction in response" may end up as "preference for a value" or even as "Commitment."

It is possible, then, that if pulse pressure indicates an affective response after a long period of time, the strong affective response causing the pulse reading is not "satisfaction in response" but rather is the action response, or "preference for a value."

Assumption Two

The balanced latin square design with testing after all treatments will be a valid design for affective domain research.

Results

The validity of this assumption is based on the results of the hypotheses whose analyses involved the dependent variables that were elicited through the use of this design.

With regard to time of testing, hypothesis four results indicated that differences in "satisfaction in response" toward subject matter were obscured (at least as measured by pulse pressure) through not measuring until all treatments were finished. Hypothesis six results indicated that differences in "preference for a value" were found, and were not obscured by testing after all the treatments were finished; similar results were found with "satisfaction in response" toward media.

Based on these results it seems that if pulse pressure is to be used as a measure of "satisfaction in response" the testing must be done _during_ or _immediately after each_ treatment, in the manner used in the original Campbell and Stanley design, and _not after all_ four treatments have been completed. On the other hand, it seems that testing _after all_ four treatments have been completed is an _adequate_ design for measuring "preference for a value."

With regard to the latin square design itself, the results are more positive. The sequential presentation of four treatments did not yield any carryover effects, and the balanced design eliminated any order effects. In addition, the use of this design considerably simplified the logistics of the experiment by decreasing the number of classes, and the number of treatments per class, that had to be used.

When used in conjunction with a control group, as in this study, the balanced latin square design is an adequate, if not a good, design for affective domain research.

Thus, the hypothesis that the balanced latin square design with testing after all treatments are finished is a valid design for affective domain research must be rejected for "satisfaction in response" and accepted for "preference for a value." A balanced latin square design with testing during the treatments would be a valid design for measuring "satisfaction in response."

Discussion

This result indicates that the basic paradigms for measuring "satisfaction in response" and "preference for a value" are different.

To measure "preference for a value" it is necessary to eliminate experimental motivation, lest it, instead of the stimulus, cause the overt action. Thus, in the design, it is necessary to not test until after all the stimuli have been presented. This is the paradigm followed in this study.

To measure "satisfaction in response" with pulse pressure, however, it is necessary to test during the presentation of the stimuli, due to the extreme affective reaction needed for pulse pressure to register differences. When the design used is the one needed for "preference," the "satisfaction" results are obscured; this is what occurred in the experiment.

It seems, then, that if "satisfaction" is to be measured by pulse pressure, it is impossible to measure both affective responses in the same study on the same Ss.

Taxonomy

The four media tested can be arranged in a taxonomy based on the highest level of affective response each medium was capable of eliciting:

FILM . . . . . Preference for a Value (3.2)

SLIDES
TAPE . . . . Satisfaction in Response (2.3)

TEACHER . . . Some level below Satisfaction in Response

Results

The validity of this conclusion is based on the results of: Hypothesis One, which indicated that preexperimental "satisfaction in response" was equal and neutral; Hypothesis Two, which indicated that preexperimental "preference for a value" was equal and significantly less than after the experiment; Hypothesis Four, which indicated that no determination could be made of the effects of media on "satisfaction in response" to subject matter in this experiment; Hypothesis Six, which indicated that only Film elicited "preference for a value" toward the subject matter; and Hypothesis Seven, which indicated that only Film elicited "satisfaction in response" toward itself as a medium.

In order for one of the presentation modes to reach the "satisfaction in response" level of the taxonomy, it would have to elicit "satisfaction" to the subject matter and/or to itself. In this study, the only medium that met this requirement was film, which only elicited "satisfaction" to itself. Thus, film did reach the "satisfaction in response" level. The other presentation modes might have done so too, but the results were obscured, as indicated earlier, by the pulse pressure and no conclusion can be drawn.

In order for one of the presentation modes to reach the "preference for a value" level of the taxonomy, it would have to elicit "preference," or action responses, toward the subject matter. In this study, the only medium that met this requirement was film. Therefore, film did reach the "preference" level. None of the other presentation modes reached this level.

Based on these results, it seems that the media can be arranged in a rough taxonomy based on the highest level of affective response elicited, and therefore the hypothesis is accepted. However, the taxonomy is much rougher and much less useful than hypothesized, due to the obscured results of one set of affective responses. The taxonomy that can be derived from this study is:

FILM	Preference for a Value (3.2)
SLIDES TAPE TEACHER . . .	Some level below Preference for a Value.

Discussion

The objective of a taxonomy of media is to provide a means for differentiating media effects and for using these differences to provide a systematic approach to the selection and use of instructional media. The utility of the taxonomy that resulted from this study must be determined in the context of this objective.

The taxonomy cited above has several limitations. First, it is hampered by the fact that one set of measures of "satisfaction in response" did not yield the information that would be essential for constructing the taxonomy. Therefore, there can be no conclusions drawn about the taxonomic levels of those media which did not reach "preference for a value." The medium that did reach "preference" provides a second limitation. The statement that "Film can elicit preference for a value, and do it better than any other medium" must be tempered with qualifications about the subject matter, the particular films, the students, the procedure, and the tests used in this study.

However, the results of this study, limited though they may be to four specific films on United States geography shown to fourth and fifth graders in one school district using a procedure involving three other presentations and two types of testing, do have meaning. The finding that films yield "preference for a value" agrees with other studies which have dealt with different subject matters

(English, biology, and history) with different Ss under different conditions. This study, then, merely adds another link to the chain of evidence of the seemingly unique ability of films to motivate further action toward subject matter.

The taxonomy derived from this study, when combined with the previous research, seems to indicate that the best method to use, or at least to start with, to motivate the passive students is film.

Summary

Preexperimental Attitudes

The control class's preexperiment "satisfactions in response" toward the four subject matters were equal and neutral, and its "preferences for a value" were equal and significantly lower than those for treatment classes.

Satisfaction in Response to Subject Matter

There were no (a) class, (b) subject matter, (c) order, or (d) media effects on "satisfaction in response" toward the four subject matters. The scores to all four subject matters that were elicited by all four media were neutral.

Preference for a Value toward Subject Matter

There were no (a) class or (b) order effects on "preference for a value" toward the four subject matters.

There were subject matter effects for the fourth grade only, where the Ss selected more books about the Rocky Mountains than about any other area. There were media effects for both grades (and for both testing after presentations and after pulse pressure testing) which indicated that (a) film elicited more book selection responses than any one of, or all of, the other presentation modes and (b) film was the only mode, when compared to preexperimental selections, which was effective in eliciting "preference for a value" toward subject matter.

Satisfaction in Response to Media

While the "satisfaction in response" number scores to the four media were equal, the distributions of the scores were different, and they indicate that (a) the hierarchy of scores was F>S>TCH>T and (b) film was the only presentation mode that elicited positive attitudes, or "satisfaction in response" toward itself as a medium.

Capillary Pulse Pressure

Capillary pulse pressure was not a valid measure of "satisfaction in response" when measured, as it was in this study, after the completion of the presentations. In addition, pulse pressure raw scores showed a tendency to increase as a function of trials (session sensitivity), and therefore did not yield a valid indication of interest for each of the individual stimuli. Ratio and difference scores, both numerical and nominal scores, however, yield nonsession sensitive scores, with all four means of analysis yielding the same results.

Design

The Balanced Latin Square Design (randomized by classes) with testing after all treatments, combined with a control group in a Post-Test-Only Design, was a valid design in all aspects but one. The latin square itself distributed the treatments adequately among the classes, provided for easy analysis of the data, and eliminated the effects of order or carryover which might have influenced the results. In addition, it simplified the experimental procedure considerably. Since no class effects were obtained in this study, it is safe to conclude that randomization by classes instead of individuals was a valid procedure. The addition of the control group to the latin square design allows for the establishment of guidelines of responding with which the treatment classes' responses can be compared.

However, when capillary pulse pressure is used as the measure of attitude, the "testing after all treatments" aspects of the design is not valid. The testing must be done during or immediately after each presentation, as indicated in the original Campbell and Stanley (1963) design, and not after all the four treatments have been completed, as done in this study.

Taxonomy

From the results of this study, the following taxonomy of media, based on the highest level of affective response each medium is capable of eliciting, can be formulated:

FILM . . . . . Preference for a Value (3.2)

SLIDES
TAPE . . . Some level below preference for a value.
TEACHER

The implications of these seven results will be discussed in the next chapter.

CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Organization of This Chapter

The first part of this chapter will review and summarize the problem of this study, the literature related to it, the methodology used to carry it out, and the hypotheses concerning its results. The second part will present the results of the experiment and the conclusions that can be drawn from them. The third and final part will discuss the implications of the results and conclusions for instructional technology, for the affective domain, for education in general, and for future research.

Summary

The Problem

This study was an attempt to look at three unsolved problems in the field of instructional technology from a new perspective. The problems in the field of instructional technology that remain unsolved are: (1) what is the contribution of media to the educational process; (2) what instructional objectives are media best suited to meet; (3) what are the different effects of different media in terms of the instructional objectives they are best suited to meet.

While most of the research in this area has ignored the affective domain, McDonald (1961) hypothesizes that the primary function of media is in the affective domain. The affective domain provided this study with the perspective through which to view and attempt to solve the problems of instructional technology.

The affective domain also has several unsolved problems. These include a tremendous lack of concern about affect, and difficulty of measurement, in terms of both measurement devices and experimental designs. This study also attempted to provide some solutions to these problems by testing a measurement device and an experimental design.

The specific problems of this small-scale, exploratory study were:

1. To compare the effectiveness of one nonmediated (teacher) and three mediated (film, slides, tape) instructional methods in eliciting two key affective responses, interest (satisfaction in response) and action (preference for a value).

2. To develop a taxonomy of media based on the degree of affective response each medium is capable of eliciting.

3. To validate capillary pulse pressure as a measure of interest or "satisfaction in response," and to vali-

date appropriate means of analyzing the pulse pressure data.

4. To test the appropriateness of the balanced latin square design with testing after all treatments for affective domain research.

Review of the Literature

A review of several definitions of attitude indicated that attitudes are complex and extremely general in their operation but that they were poorly defined until Krathwohl's (1964) Taxonomy. This operational definition of affective learning clarifies terminology, takes into account the intensity of the affective response, and allows for the prediction of the control of the response over behavior.

A review of these definitions and several theories related to attitudes and to learning theory indicated that the affective domain is extremely important, since affective responses, especially "satisfaction in response" and "preference for a value," seem to be a prerequisite for cognitive learning. In school this is important because the student is "emotionable" and positive affective responses must be developed to the subject matter and the instructional methods.

A review of the research and theory related to the effectiveness of instructional media in eliciting these positive affective responses indicated that media can elicit "satisfaction in response" both to subject matter and to themselves, and that some media can elicit "preference for a value" toward subject matter. Some theorists have indicated that this is true because media have positive attitudes associated with them from other situations which can be used to change attitudes toward other "objects." Some theorists have gone further to suggest that media may be the most effective stimuli available for eliciting these prerequisite affective responses.

This study was an attempt to test this last set of conclusions.

Methodology

The Ss in this study were fourth- and fifth-grade students. The dependent variables selected for study were "satisfaction in response," as measured by capillary pulse pressure, and "preference for a value," as measured by voluntary book selections. Four films on United States geography formed the basis of the study, and they were transformed into slides, tapes, and teacher presentations. Test slides elicited the pulse pressure reactions both to the subject matter and the media.

The overall experimental design was a modification of the Post-Test Only Control Group Design which allowed for use of intact classes. The Treatment Group Design was the Balanced Latin Square, which eliminated the effects of carryover. In addition, in order to eliminate experimental motivation, testing was done after all the treatments were finished instead of after each treatment.

Several conferences were held with participating teachers before the experiment was conducted. Each teacher received a procedure manual which detailed exactly what he/ she had to do in each phase of the study. Teachers introduced the experiment to the Ss by using a summer vacation and travel theme. Ss then received four presentations, one by each medium being tested, with each being on a different subject matter. Ss were then given the opportunity to select a book on one of the four subject matters. Finally, Ss were taken to the test room and pulse pressure measures were obtained.

For analysis, pulse pressure scores were converted to ratios and differences (relative to control slides) and class means were used; in addition these numerical scores were converted to High and Low scores and analyzed as proportions. Book selection responses were converted to proportions of Ss selecting each book for analysis. The statistical tests used most frequently included one-way ANOVA, z-test, chi-square test, and Latin Square ANOVA for Residual Effects.

Hypotheses

One. Pulse pressure scores will indicate that pre-experimental "satisfaction in response," or interest responses, toward the four subject matters were (a) equal and (b) neutral.

Two. Voluntary book selection scores will indicate that preexperimental "preference for a value," or action responses, toward the four subject matters were (a) equal and (b) zero.

Three. Pulse pressure scores will indicate that "satisfaction in response" toward the four subject matters was not affected by (a) classes, (b) subject matter, or (c) order of presentation.

Four. Pulse pressure scores will indicate that "satisfaction in response" toward the four subject matters was affected (a) by media, (b) in a hierarchy: F>S>T>TCH.

Five. Book selection scores will indicate that "preference for a value" toward the four subject matters was not affected by (a) classes, (b) subject matter, or (c) order of presentation.

Six. Book selection scores will indicate that "preference for a value" toward the four subject matters was affected (a) by media, (b) in a hierarchy: F>S>T>TCH.

Seven. Pulse pressure scores will indicate that "satisfaction in response" or interest responses toward the four media form a hierarchy: F>S>T>TCH.

Assumptions

One. Capillary pulse pressure will (a) be a valid measure of "satisfaction in response" and (b) yield the same results when analyzed by several different methods.

Two. The balanced latin square design with testing after all treatments will be a valid design for affective domain research.

Taxonomy

The four media tested can be arranged in a taxonomy based on the highest level of affective response each medium was capable of eliciting:

FILM . . . . Preference for a Value (3.2)

SLIDES TAPE . . . Satisfaction in Response (2.3)

TEACHER . . Some level below Satisfaction in Response.

Results and Conclusions

The results and conclusions obtained from this study are summarized below. The results are statements that are based solely on the analyses of the data. The conclusions are inferences from the results, and are based on the discussions of each result in Chapter IV.

Preexperimental Attitudes

Results.--The control class's preexperiment "satisfactions in response" toward the four subject matters were equal and neutral, and its "preferences for a value" were equal and significantly lower than those for treatment classes.

Conclusion.--Preexperimental attitudes toward the four subject matters were equal, and effects obtained in this study were the result of the treatments administered.

Satisfaction in Response to Subject Matter

Results.--There were no (a) class, (b) subject matter, (c) order, or (d) media effects on "satisfaction in response" toward the four subject matters. The scores to all four subject matters that were elicited by all four media were neutral.

Conclusion.--No conclusion can be drawn with regard to media effectiveness in eliciting "satisfaction in response" toward subject matter because these results were obscured by pulse pressure. Testing after all the presentations were finished, instead of during the presentations, allows time for some of the affect to dissipate; since pulse pressure needs extreme affective responses to indicate a positive affect state, this dissipated affect was not enough to influence pulse pressure scores. The conclusion to be drawn from this result, then, is a methodological one: if pulse pressure is to be used as a measure of "satisfaction in response," the scores must be obtained during the presentations, not after them.

Preference for a Value toward Subject Matter

Results.--There were no (a) class or (b) order effects on "preference for a value" toward the four subject matters. There were subject matter effects for the fourth grade only, where the Ss selected more books about the Rocky

Mountains than about any other area. There were media effects for both grades (and for both testing after presentations and after pulse pressure testing) which indicated that (a) film elicited more book selection responses than any one of, or all of, the other presentation modes and (b) film was the only mode, when compared to preexperimental selections, which was effective in eliciting "preference for a value" toward subject matter.

Conclusion.--This finding is in agreement with other research concerned with the same question. While the finding of this study must be delimited by the particular conditions of the study, it does add another link to the chain of evidence which indicates the unique ability of films to motivate further actions toward subject matter.

Satisfaction in Response to Media

Result.--While the "satisfaction in response" number scores to the four media were equal, the distributions of the scores were different, and they indicate that (a) the hierarchy of scores was F>S>TCH>T and (b) film was the only presentation mode that elicited positive attitudes, or "satisfaction in response" toward itself as a medium.

Conclusion.--The fact that such a result was obtained with pulse pressures scores while using the "testing after" paradigm indicates that the positive attitudes toward film were extreme. It is probable that this attitude was not generated by this study alone, and that it is based on past positive attitudes which were formed outside of the experimental situation. This strong and general "satisfaction in response," and perhaps even "preference for a value," toward film seems to indicate that film makes an extremely good "referent object" (in Edling's [1963] attitude change paradigm) for eliciting attitudes toward criterion objects.

Taxonomy

Result.--From the results of this study, the following taxonomy of media, based on the highest level of affective response each medium is capable of eliciting, can be formulated:

FILM	Preference for a Value (3.2)
SLIDES TEACHER . . . TAPE	Some level below preference for a value.

Conclusion.--This taxonomy is limited in many ways. First, it is limited by the particular conditions of this study. Second, it is limited by the fact that "satisfaction in response" toward subject matter, which is extremely important for such a taxonomy, had to be omitted because of the lack of conclusive results from this study. Nonetheless, the taxonomy does provide an indication that there are indeed differences between the media tested in their ability to elicit affective responses. This implies that such a taxonomy on a large scale might be feasible. The taxonomy presented above represents a start in this direction.

Capillary Pulse Pressure

Result.--Capillary pulse pressure was not a valid measure of "satisfaction in response" when measured, as it was in this study, after the completion of the presentations. In addition, pulse pressure raw scores showed a tendency to increase as a function of trials (session sensitivity), and therefore did not yield a valid indication of interest for each of the individual stimuli. Ratio and difference scores, both numerical and nominal scores, however, yield nonsession sensitive scores, with all four means of analysis yielding the same results.

Conclusion.--It appears, from the results of this study, that capillary pulse pressure, as a measure of attitudes, is not as valid or as easy to use as Bergum and Lehr (1966a-e) and Bergum, Lehr, and Dooley (1967) claim. With regard to its validity, pulse pressure is limited by the extreme affect needed to influence the scores. Thus, pulse pressure seems to be valid only when it is measured during the presentation of the stimuli, and not when it is measured after the presentation.

In terms of its utility, pulse pressure is limited by its limited validity. Since it must be measured during a presentation, pulse pressure seems to be useful only as a measure of immediate general attitudes toward the stimulus presentation, and not as a measure of more long-term specific attitudes toward the subject matter presented. If it is used as a measure of retention of attitude, however, it is possible that the strong affective response which it might pick up is not "satisfaction in response" but rather is some stronger affective response such as "preference for a value."

Problems in analyzing the pulse data also limit the usefulness of the measure. While the ratio and difference scores are valid, the work necessary to obtain them is long and tedious. For any large-scale work to be practical, the transducers must be hooked directly to a hybrid computer which can translate the pulse data to numbers and perform the necessary calculations.

Design

Results.--The Balanced Latin Square Design (randomized by classes) with testing after all treatments, combined with a control group in a Post-Test-Only Design, was a valid design in all aspects but one. The latin square itself distributed the treatments adequately among the classes, provided for easy analysis of the data, and eliminated the effects of order or carryover which might have influenced the results. In addition, it simplified the experimental procedure considerably. Since no class effects were obtained in this study, it is safe to conclude that randomization by classes instead of individuals was a valid procedure. The addition of the control group to the latin square design allows for the establishment of baselines of responding with which the treatment classes' responses can be compared.

However, when capillary pulse pressure is used as the measure of attitude, the "testing after all treatments" aspects of the design is not valid. The testing must be done during or immediately after each presentation, as indicated in the original Campbell and Stanley (1963) design, and not after all the four treatments have been completed, as done in this study.

Conclusions.--These results indicate that the Balanced Latin Square with testing after all treatments is a valid design for affective domain research if "preference for a value" is being measured, but not if "satisfaction in response" is being measured by pulse pressure.

This finding may be indicative of a basic difference in paradigm between measurement of the two responses. Measurement of "preference" demands, due to experimental motivation, that testing be postponed until after all four treatments have been finished, while measurement of "satisfaction," at least by pulse pressure, demands that testing be done during the presentations. Thus, if "satisfaction in response" is to be measured by pulse pressure, or perhaps by any other means as well, it is impossible to measure it in the same experiment on the same Ss being used to provide a measure of "preference for a value."

Implications

The results and conclusions summarized above have implications for four important areas: (a) instructional technology, (b) the affective domain, (c) education in general, and (d) future research. Each of these areas will be discussed below.

Instructional Technology

Three problems in the field of instructional technology led to this study: the determination of the contribution of media to the educational process, the selection of the type of instructional objectives media are most effective in bringing about, and the development of a taxonomy of media. The author believes that the results of the study have implications for seeking solutions to these problems.

Contribution.--According to the generally accepted notion, media must enhance, or improve the effectiveness of, learning in order to make a contribution. Operationally, this means that media, when compared with "conventional instruction," must yield higher test scores.

This conception is, clearly, too vague and general to have any real meaning. However, it is the conception which most people outside of the field of instructional technology use to judge media. Therefore, it is necessary to provide some solution, albeit oversimplified, to this problem, rather than to ignore the problem altogether.

The comparative studies in the cognitive domain indicate no difference between mediated and teacher-administered instruction. If this study is looked at as a simple comparative study, however, it does indicate a difference. A difference was found between the effectiveness of film and the teacher, and this difference was found in the affective domain. The results of this study, put in an oversimplified manner, indicate that film is more effective than a teacher in bringing about attitudinal learning.

This result indicates that media do make a contribution to learning, and that that contribution is to increase learning in the affective domain.

Whether this conclusion can be taken one step further, as McDonald (1961) does, to state that the primary contribution of media is in the affective domain, cannot be decided from this study alone. A preliminary indication of the validity of the statement can be obtained, however, by comparing the "no differences" in the cognitive domain with the "differences" obtained here in the affective domain. This certainly does not constitute a proof, but it does imply that further work along this line might prove fruitful.

In terms of the simplistic conception of a "contribution" of media, then, this study indicates that media do make a contribution to learning--to affective learning--and it is possible that their effect on affective learning is their primary contribution.

Instructional Objectives.--Regardless of any statement of the general contribution of all media, specific media must be matched with specific instructional objectives before they can be of any use in instruction. One of the few attempts to do this matching (Briggs, et al. [1967], cited in Chapter I) did so (a) based on a taxonomy of cognitive instructional objectives and (b) intuitively.

The results of this study indicate, however, that the matching of media with objectives can be done (a) based on a taxonomy of affective objectives and (b) empirically.

For any subject matter at any grade level, the affective objectives can be specified according to the Krathwohl Taxonomy. Then, several different methods, both mediated and nonmediated, of reaching that objective can be tested on students. The one mode, or several modes, which most effectively achieve that objective can be considered to be matched with it. This is the procedure used in this study. It yields descriptive data, which is limited by the subject matter, grade level, affective objectives, presentation modes, and students.

However, if this procedure is repeated with a sufficient number of combinations of subjects, grades, objectives, modes, and students, it is possible that a general pattern might emerge. From this pattern, it would be possible to derive a generalized statement of which media can best meet which objectives. If this should occur, the matching procedure would yield prescriptive data for the use of media in a classroom situation.

In terms of matching specific media with specific instructional objectives, then, this study indicates that, for specific objectives in specific subject matters and for specific media, this matching can be done empirically in the affective domain, and that the possibility exists that this matching can eventually lead to general, prescriptive statements.

Taxonomy.--The taxonomy of media that Allen (1967), Briggs, et al. (1967), and Meredith (1965) have called for is a taxonomy based on the effectiveness of different media in the cognitive domain.

The results of this study indicate, however, that such a taxonomy is feasible based on effectiveness in the affective domain.

This taxonomy is based on the results of the matching of media with instructional objectives, as discussed above. For a particular subject matter, at a particular grade level with particular students, each of the many affective objectives has been matched with the most effective presentation mode. Since these affective objectives form a hierarchy (based on Krathwohl's Taxonomy), the presentation modes or media matched with them also form a hierarchy. This hierarchy, or taxonomy, of media indicates the highest level of affective response each mode is capable of eliciting. This procedure was followed in this study, using only two affective responses, and only one subject matter, etc. Within these limitations, though, a taxonomy could be formed. This indicates that this procedure may be a useful one.

As discussed above, if this procedure is repeated with sufficient numbers of combinations of subjects, students, etc., a general pattern might emerge. From this pattern, it would be possible to derive a general taxonomy of media.

In terms of a taxonomy of media, then, this study indicates that, for specific subject matter situations, a taxonomy of media based on affective responses can be derived, and that the possibility exists that a general taxonomy of media could be developed using the same criteria.

Affective Domain

Two problems in the affective domain led to this study--the lack of work in this domain, and the difficulty of measurement. The author believes that the results of this study also have implications for seeking solutions to these problems.

Lack of Concern.--While there is much literature (cited in Chapter II) indicating the extreme importance of the affective domain and the need to understand it in more detail, researchers have tended to shy away from research in this area--mainly, according to Krathwohl (1964), because of the difficulties involved in such research.

The results of this study fully support the notion that research in the affective domain is considerably more difficult than research in the cognitive domain. However, the results also indicate that such research can be done.

The author recognizes that, in performing this study, many questionable assumptions had to be made, and many mistakes were made. It is the author's hope, however, that these problems (such as in design and measurement, discussed below) have been clarified somewhat so that future research in the affective domain will not make the same mistakes.

As more and more research is done in the affective domain, the mistakes made will become fewer and fewer. Whatever mistakes will be made along the way, however, this research must be done. Hopefully, the results of this study indicate that this research can be done.

Measurement.--Krathwohl (1964) has indicated that one of the greatest barriers to affective domain research is the lack of valid, reliable, convenient measure of attitude.

Bergum and Lehr (1966a-e) were optimistic that capillary pulse pressure would provide this much needed measure.

The results of this study, however, indicate that a considerable amount of research is necessary before pulse pressure can be considered a usable measure of affect.

One of the major problems uncovered by this study concerns the relatively low sensitivity of pulse pressure and the resulting requirements for timing of testing, which must occur during the stimulus presentation.

The timing of testing itself has implications. The research design selected for a study is based partly on when the tests must be administered.

The results of this study indicated that the Balanced Latin Square Design with Testing after All Treatments is a valid design for testing for "preference for a value," because it is not until after the stimulus presentation that preference can be measured. In testing for "satisfaction in response," however, a Balanced Latin Square Design with Testing during Each Treatment is called for, if satisfaction is being measured by pulse pressure.

The results of this study also have implications for the selection of the basic unit of experimentation. Campbell and Stanley (1963) state that randomization of Ss in an experiment must be in terms of individuals. However, since no class effects were found in this study, it seems that it is possible to assign intact classes, instead of individuals, to treatments in affective domain research. This procedure would greatly reduce experimental motivation, and its confounding effects, and allow for more accurate measurement of true affective responses.

In terms of measurement of affective responses, then, this study indicates several testing, design, and randomization considerations which should be taken into account by future affective domain research.

Education in General

In addition to the implications for research, theory, and methodology discussed above, this study seems to have implications for the classroom.

There is always the danger, in drawing implications from a study such as this, of overgeneralizing and making statements which go beyond the materials used and the data gathered. The materials used in this study were four short film segments, and the slides, tapes, and teacher presentations developed from them, on the geography of the United States. The data gathered consisted of pulse pressure scores and book selection responses.

With these materials, the data gathered indicated that film elicited more "satisfaction in response" to itself and more "preference for a value" toward the subject matter than did any of the other presentation modes, and it was the only mode that elicited these responses beyond the baseline level. This indicates that in this situation film was far and away the most effective medium or presentation mode for eliciting affective responses.

This conclusion cannot be generalized to all subject matters, materials, students, etc. However, when it is combined with the results of the other studies cited in Chapter II, which indicate the same effects of film on affect, it presents a pretty strong case for the use of film to create interest and to motivate action.

The implication of this conclusion is not that the classroom teacher should use film exclusively in the classroom. However, it indicates that if some of Wallington's (1968) "passive" students are in the class and lack intrinsic motivation, then a film which is so successful at eliciting extrinsic motivation might be a good place to start the shaping process.

No one can yet scientifically explain to the teacher why this effect of film occurs. It is possible that it is a carryover from entertainment media, that it is a configuration medium instead of a linear medium (as McLuhan [1965] would have it), or that it is based on the operation of some factor as yet unknown.

However, the author agrees with Wallington (1968:3) that, for the classroom teacher, "there is sufficient reason to utilize such tools merely on the basis that they work and leave the investigation of why to others." This is the implication of this study for the classroom and for education in general.

Future Research

The investigation of "why" must be carried on by others--the educational researchers. The author believes that this study has several implications for this future investigation.

Some of these implications have already been referred to earlier in this section. In the area of matching media with instructional objectives and a taxonomy of media, research is needed to apply the empirical matching procedures used in this study in many different combinations of subject matters, grade levels, students, modes of presentation, and affective instructional objectives. This long series of studies will determine whether or not a general pattern of media-objective relationships exists and whether a taxonomy of media based on affective responses is possible, as this study has suggested.

In the area of measurement, research is needed to test the utility of pulse pressure as a measure of attitude. This research could take the form of a test of pulse pressure alone, or the form of a test of many different types of measures (as Bergum and Lehr do). This research must be concerned with both the sensitivity of pulse pressure and the times at which pulse pressure measurements should be taken. It must also look for additional, and simpler, methods of analyzing pulse data. Research is also needed to determine the appropriate experimental paradigms that must be used in testing for each of the affective responses proposed in Krathwohl's Taxonomy, since this study has indicated that they might be different for each response.

In addition, research is needed within media--research to determine what it is about a particular medium that yields its effects. If students like film, what is it about film they like; what techniques could producers use in the future to make more effective films. Much of this type of research has been done in relation to cognitive learning (cf. Hoban and van Ormer [1950]), and has shown that, in general, certain techniques have no effect on learning. They may, however, have effects on affective learning, and researchers must discover what these effects are.

It can be concluded, in fact, that, in view of the lack of research related to the affective domain, any research that would concern itself with the affective domain itself, or with the relationship between the affective domain and instructional media, is needed and would aid considerably in either providing solutions to already existing problems or discovering new problems to be solved.

Conclusion

This study has been an attempt to bring a new perspective to instructional media research. It has been an attempt to relate media and the affective domain. The author looks on this study as a groundbreaking study in this area, a study to define some of the parameters and discover some of the problems in this area.

This study, the author believes, will also serve as a motivating device. Hopefully it will elicit in its readers either enough agreement or enough disagreement and anger to cause them to perform their own research. The research that it motivates may be designed either to confirm or to disprove the findings of this study. But in either case, it will have served its purpose.

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APPENDIXES

APPENDIX A

TRANSCRIPTIONS OF FILM NARRATIONS

MIDDLE ATLANTIC SEABOARD REGION

MIDDLE ATLANTIC SEABOARD REGION

These sights and sounds are only a part of one of the most astonishing and complicated parts of the world--an area filled with more wonders and problems than any comparable place in all of man's history. One American in ten lives here, and if you were to take all their automobiles and park them end to end, that line of cars would circle the earth twice.

You may be wondering where in the United States such a city exists. As a single city--a city whose name we would recognize--it does not exist. It exists as a chain of connected cities and suburbs forming one huge urban community. It covers an area over two hundred miles in length, along the Middle Atlantic Seaboard of the United States. Some of the larger links in this enormous chain city are Baltimore, Philadelphia, and New York City. Other smaller ones are Wilmington, Camden, Trenton, and Newark. In between these larger cities and towns are suburbs which are filling in the countryside.

To describe this super-city which is emerging, a new term has been formed. The term comes from two ancient Greek words--Megalo, meaning great, and Polis, meaning city. The word Megalopolis refers to a group of connected localities which functions as one enormous city.

Megalopolis grew from seeds planted nearly three hundred years ago. The first colonists in the new world picked locations for settlements which would make good seaports for ships coming from Europe. Rivers were the main highways of commerce to the interior, and such cities in better locations became busy ports, with New York at the mouth of the Hudson River, Philadelphia on the Delaware, and Baltimore on the Chesapeake Bay.

Today, each of these cities still serves as an important gateway to our country. Nearly one half of American foreign trade--over one hundred million tons each year--is loaded and unloaded at these great ports. New York City, with its five hundred miles of waterfront, is the greatest shipping center in the world. A ship enters or leaves every ten minutes.

To efficiently transport goods to and from these port cities, they are linked to each other and to the rest of the nation by a network of railroads, superhighways, and airlines.

Megalopolis produces and distributes much of what is used by the nation and the world. Its many businesses offer a great variety of jobs which attract many people to this area.

Most of the nation's clothes are made here, with the garment industry employing fashion and fabric designers, pattern makers, cutters, tailors, artists, and models.

Buyers come from all over the country to preview new styles and to choose clothes for their local stores. Some of the very clothes you're wearing were probably manufactured in Megalopolis and shipped by truck to the store where you bought them. You may have heard or seen advertisements for these same clothes on radios or television sets which use these electronic components. In school today, the pencil you've been using may be one of those made and packed here.

At dinner tonight, you may well eat one of the enormous variety of foods processed in Megalopolis and reshipped to other sections of the country. This machine, for instance, cracks over a million eggs a day. The eggs, mixed with other ingrediants, make mayonnaise, which is automatically bottled. Also automatic are many of the operations in the large meat packing industry of Megalopolis. Beef, pork, lamb, and veal arrive from the Midwest and nearby states, and are converted into many packaged meat products.

GREAT PLAINS

GREAT PLAINS

About a hundred years ago, a boy named Tom Mason started on a voyage. The covered wagon in which he rode was called a prairie schooner, or a ship of the plains, because the land he entered did resemble a sea. But it was a sea of grass.

The Mason family was moving into a region of the United States that we call the Great Plains. This is grassland that lies East of the Rocky Mountains. It extends from the Rio Grande in Texas north to Canada.

To Tom Mason, this new land was a little frightening. It was very different from the land he had known in the East. There were few trees, except near streams and rivers. Tom could look for miles in any direction and see the horizon. As they moved West, it still seemed only a land of grass, but this is where the Mason family settled, in South-Central Kansas. A few miles to the Southwest is Fort Dodge. Near the Fort a town would grow and become known as Dodge City.

The Masons' first home was made of dirt and grass. It was called a sod house. As Tom grew older, the Masons built a frame house. Years later one of Tom's own children built this house on the same site.

And today another Tom Mason lives with his family on the same land that his grandfather first saw as a boy about a hundred years ago. The Masons did survive here into the fourth generation, and they expect to remain, because theirs is now the land of the golden harvest, and of well-nourished livestock.

Everywhere in the Great Plains, things have changed. Where the wagons once rode, trucks hurry to market on modern highways.

Above the plains, rise huge grain storage elevators, and skylines of cities. Where the land was uncultivated, green crops grow, and fields of hay, and most of all, wheat.

Many things help the people on the plains to survive and to prosper. One is something the plains have in abundance--grass. Grass that livestock can eat, and special types of grasses which provide food for people. Wheat is a member of the grass family. Some men thought the Great Plains were too dry even for wheat. The eastern part, the farm country, receives an average of more than twenty inches of rain a year. In the 1870's, some Russian immigrants settled on the Plains and planted some wheat seeds they had brought with them. Those seeds thrived and the Great Plains had a product the whole world wanted.

In addition to new varieties of wheat, methods called dry farming were introduced. In dry farming, the land is cultivated so that it will soak up and store the moisture it does receive. Cultivation also helps the farmers to combat wind and weeds. Dry farming is practiced mostly in the western half of the Great Plains, where the Mason family lives.

Tom Mason the Third, with the help of his sons, John and Bob, starts soon after the summer harvest to prepare his more than a thousand acres of wheatland. The land is flat and even, permitting the use of a wide plow, or several plows hitched together, to speed up the work. The Masons work the remains of last year's crop into the ground to help hold the soil and protect it against the winds that blow across the Plains. The evenness of the land, and modern machinery, enable the Masons to manage such a large farm. In the fall they plant their wheat seeds, using a machine called a drill. It puts the seeds into the ground and covers them with soil. The plants start to grow in the fall, and the roots stay alive in the ground all through the winter. That is why wheat grown in this region is called winter wheat. In the spring, the wheat begins to grow again, using the moisture stored in the ground. Now Tom Mason and his neighbors look for and want rain, for the wheat will need more moisture to continue growing.

ROCKY MOUNTAIN AREA

ROCKY MOUNTAIN AREA

My name is Bob Sawyer. I am a ranger for the United States Forest Service in the Rocky Mountains of Colorado. I live here at the Buckhorn Ranger Station, but I spend most of my days out in the field. I'll cover a lot of territory today, checking to see that our National Forest resources are being used safely and in the best way possible.

Because much of the country up here is wild and rugged, not many people live in this part of the United States. There's lots of untouched land, with forests and snow-covered mountains and plenty of wildlife too.

This is high country, with mountain peaks over 14,000 feet tall. Even a few glaciers.

The Rocky Mountains stretch all the way from Canada almost to the Mexican Border, from north to south across the United States. They cut through Washington, Montana, Idaho, Wyoming, Utah, Colorado, and taper off southward at New Mexico. The Rockies have been a challenge to people ever since the early days of America. Many pioneers on their way to the gold fields of California thought of turning back when they saw those peaks rising from the Great Plains. And even when they had crossed the mountains, there was more trouble waiting on the other side, with over 400 miles of desert land lying ahead.

That land was the Inner Mountain Region, which stretches all the way from the Rockies to the mountains of California and Oregon, and includes a part of every one of our Western States. The Inner Mountain Region is mostly high, dry country, made up of broad plateaus, steep cliffs, and deep canyons.

Thousands of years ago, it was a land of many rivers, but today, water flows through the riverbeds only when it rains. Many of the lakes have no outlet and the evaporation of water has made them extremely salty. The Great Salt Lake in Northern Utah is five times saltier than the Pacific Ocean.

The Rockies play an important part in giving life to this desert land. In fact, more than half the United States would be unable to get along without water from the Rocky Mountains. The mountains receive water when winds filled with moisture blow eastward from the Pacific Ocean. As these winds rise and become cool over the Rockies, snow and rain fall, especially on the Western slopes.

When spring comes, the melting snow and rain form little streams. The streams join together to form rivers. The rivers flow down from the Rockies, bringing water to the lands below.

Up here, at the highest point in the Rockies, is a ridge called the Continental Divide. You might call it the backbone of the U.S.A. On one side of the Divide, streams flow westward toward the Pacific Ocean, forming rivers like the Columbia, the Snake, and the Colorado. On the other side, streams flow eastward toward the Gulf of Mexico, forming the Missouri River, the Platte, the Arkansas, and the Rio Grande.

This is where I work, Roosevelt National Forest. Much of the land in the Rockies is national forest, owned by the United States government. Here in the mountains, heavy rains make big forests of spruce, fir, and pine. Lumbering is carried on in many parts of the Rockies. Lumber companies pay for the right to cut down a certain number of trees on privately owned lands, and on publicly owned lands of the National Forests. The trees that are cut down will be sent to sawmills or to pulp and paper mills. In addition to providing for a future crop, those that are left standing, will serve to protect the land when it rains, so that good topsoil won't be washed away.

GULF COAST

GULF COAST

The Gulf Coast is one of the fastest growing areas in the southern part of the United States. This area, along the Gulf of Mexico, has a coastline nearly 2000 miles long. The Gulf Coast runs from southern Florida along Alabama, Mississippi, Louisiana, and Texas, to the Mexican Border at the Rio Grande River. One of the best known aspects of the Gulf Coast is its popularity as a winter vacation area. Located at the eastern end is Miami Beach, Florida, one of the largest and most famous resort centers in the South. Millions of people come to this area each year to enjoy the sunshine and warm water. These children might be making snowmen if they were back home in Massachusetts or Minnesota, but here on the beaches in Florida they are building sand castles. In the evenings there is an endless variety of hotels, restaurants, and night clubs to suit everyone's taste. Day or night, there never seems to be enough time to enjoy all the activities.

Not far from Miami Beach around the southern tip of Florida and northward along Florida's west coast, there are many other well known resort towns such as Naples, Fort Myers, Sarasota, and St. Petersburg.

Attracting visitors has become one of Florida's leading industries. Today many people visit this area to see the sights, enjoy the many outdoor activities, and relax in the warm sun. The sun is also important to farming twelve months of the year. During the winter season when northern areas of the United States are cold and snowy, gardens thrive along the Gulf Coast. A profitable variety of crops are grown to supply local needs as well as those of neighboring states. The Gulf Coast farmers found that there are many ways to take advantage of the land. The soil in this region differs from one area to the next. Sandy soil can be very productive with the use of chemical fertilizer. In some areas too much rain creates a problem. Each year heavy rainfalls soak the lowlands from Eastern Texas to Florida. Farmers must use pumps to remove excess water from the fields.

In other sections of the Gulf Coast, there is a scarcity of water. Irrigation ditches are used to bring water to the fields from upland areas where there is more rainfall.

Swampland is being cleared and drained for the first time leaving rich, fertile soil. With hard work and careful cultivation, farmers of the Gulf Coast are reclaiming land which was formerly useless.

A great variety of crops thrive in the Gulf Coast region. In Florida, oranges are a major part of the citrus crops which are sent to nearby canneries and freezing plants. The growing of citrus crops, such as oranges, grapefruits, lemons, and limes, is an important industry. Florida and Texas produce well over half of all these fruits grown in our country.

In other parts of the Gulf Coast, farmers use the water-soaked lowlands to grow rice. Huge harvesters do most of the work. They are similar to those used to harvest wheat and oats. There is one big difference though. Large, soft, rubber tires are used to support the tremendous weight of the harvester on damp, spongy ground. Without these unusual tires, the machinery would be unable to move.

In Southern Louisiana, the mild winters permit the growing of sugar cane. Sugar cane is also harvested by machine. Giant cutters leave rows of cane to be lifted by large steel hands. Most of its crop will be processed at nearby sugar mills.

The Gulf Coast ports receive much fresh fruit coming into the United States from Central and South America. When fruit such as bananas arrive it is transferred from ships to trucks.

APPENDIX B

SENTENCE OUTLINES FOR TEACHER PRESENTATIONS

MIDDLE ATLANTIC SEABOARD REGION OUTLINE

I. Introduction

  A. Middle Atlantic Seaboard Region is one of the most astonishing and complicated parts of the world.

  B. Has more wonders and problems than any comparable place in all of man's history.

  C. One American in ten lives here.

  D. All their automobiles, if parked end to end, would circle the earth twice.

II. Location

  A. Where is it located?

  B. Does not exist as a single city whose name we recognize.

  C. It exists as a chain of connected cities and suburbs forming one huge urban community.

  D. It covers an area over two hundred miles in length along the Middle Atlantic Seaboard of the United States.

  E. Some of the larger links in this enormous chain city are Baltimore, Philadelphia, and New York City.

F. Other smaller ones are Wilmington, Camden, Trenton, and Newark.

G. In between these larger cities and towns are suburbs which fill in the countryside.

III. Name

A. To describe this emerging super-city, a new term has been formed.

B. The term comes from two ancient Greek words:

1. Megalo--meaning great, and

2. Polis--meaning city.

C. The word megalopolis refers to a group of connected localities which function as one enormous city.

IV. History

A. Megalopolis grew from seeds planted nearly three hundred years ago.

B. The first colonists in the new world picked locations for settlements which would make good seaports for ships coming from Europe.

C. Rivers were the main highways of commerce to the interior, and such cities in better locations became busy ports:

1. New York at the mouth of the Hudson River,

2. Philadelphia on the Delaware River, and

3. Baltimore on the Chesapeake Bay.

V. Ports Today
    A. Today each of these cities serves as an important gateway to our country.
    B. Nearly one-half of American foreign trade--over one hundred million tons each year--is loaded and unloaded at these great ports.
    C. New York City has five hundred miles of waterfront, and is the greatest shipping center in the world.
    D. A ship enters or leaves every ten minutes.

VI. Transportation
    A. Something is needed to efficiently transport goods to and from these port cities.
    B. Therefore they are linked to each other and the rest of the nation by a network of:
        1. Railraods,
        2. Superhighways, and
        3. Airlines.

VII. Industry in General
    A. Megalopolis produces and distributes much of what is used by the nation and the rest of the world.
    B. Its many businesses offer a great variety of jobs which attract many people to this area.

VIII. Clothing
    A. Most of the nation's clothes are made here.
    B. The garment industry employs many people:

1. Fashion and fabric designers,
2. Pattern makers,
3. Cutters,
4. Tailors,
5. Artists, and
6. Models.

C. Buyers come from all over the country to preview new styles.

D. They also choose styles for their local stores.

E. Some of the very clothes you are wearing were probably manufactured in Megalopolis, and shipped by truck to the store where you bought them.

IX. Miscellaneous Industry

A. You may have seen advertisements for these same clothes on radio or television sets which use electrical components manufactured in Megalopolis.

B. The pencil you are using in school today may be one of those made and packed in Megalopolis.

X. Food Industry

A. At dinner tonight, you may well eat one of the enormous variety of foods processed in Megalopolis and reshipped to other sections of the country.

B. Many machines are used in the processing of food.

C. There is a machine, for instance, that cracks over a million eggs a day.

D. These eggs are mixed with other ingredients to make mayonnaise, which is automatically bottled by a machine.

E. Many of the operations in the large meat-packing industry of Megalopolis are also automatic.

F. Beef, pork, lamb, and veal arrive from the Midwest and nearby states, and are converted by machines to many packaged meat products.

XI. Conclusion

A. If you would like to know more about these industries of Megalopolis, or about the Middle Atlantic Seaboard in general, you will have a chance to pick a book that will tell you more about it later.

GREAT PLAINS OUTLINE

I. Introduction

   A. About a hundred years ago, a pioneer family started on a voyage.

   B. They rode in a covered wagon that was called a prairie schooner, or a ship-of-the-plains, because the land they entered did resemble a sea --a sea of grass.

II. Location

   A. The region the pioneers were moving into is that part of the United States called the Great Plains.

   B. This is grassland that lies East of the Rocky Mountains, and extends from the Rio Grande in Texas North to Canada.

III. Geography

   A. To the pioneer family, this land was a little frightening.

   B. It was very different from the land they had known in the East.

   C. There were few trees, except near streams and rivers.

D. They could look for miles in any direction and see the horizon.

E. Though it seemed like a sea of grass, the pioneer family settled in South-Central Kansas.

F. A few miles to the Southwest of where they settled is Fort Dodge.

G. Near the Fort a town grew and became known as Dodge City.

IV. Housing

A. Their first house was made of dirt and grass and was called a sod house.

B. As time went on, they built a frame house.

C. Many generations later, they built a modern house in the same place.

V. The Plains Today

A. Today, the descendants of the same family live on the same land.

B. They survived here and expect to remain here.

C. Their land is now the land of the golden harvest and of well-nourished livestock.

D. Everywhere in the Great Plains, things have changed.

E. Where wagons once rode, trucks hurry to market on modern highways.

F. Above the plains rise huge grain storage elevators and skylines of cities.

G. Where the land was uncultivated, green crops grow, and fields of hay, and most of all, wheat.

VI. Wheat

A. Many things help the people on the plains to survive, and to prosper.

B. One is something the plains have in abundance--grass.

C. Grass that livestock can eat, and special types of grasses that produce food for people.

D. Wheat is a member of the grass family.

E. Some men thought the Great Plains were too dry even for wheat.

F. The Eastern part, the farm country, receives an average of more than twenty inches of rain a year.

G. In the 1870's, some Russian immigrants settled on the Plains and planted some wheat seeds they had brought with them.

H. These seeds thrived, and the Great Plains had a product the whole world wanted.

VII. Farming Techniques

A. In addition to new varieties of wheat, methods called Dry Farming were introduced.

B. In dry farming, the land is cultivated so that it will soak up and store the moisture it does receive.

C. Cultivation also helps the farmers to combat wind and weeds.

D. Dry farming is practiced mostly in the Western half of the Great Plains, where the pioneer family had settled.

VIII. Planting Wheat

A. The farmers start soon after the summer harvest to prepare their thousands of acres of wheatland.

B. The land is flat and even, permitting the use of a wide plow, or several plows hitched together, to speed up the work.

C. The farmers work the remains of last year's crop into the ground to help hold the soil and protect it against the winds that blow across the plains.

D. The evenness of the land, and modern machinery, enable the farmers to manage such large farms.

E. In the fall, they plant their wheat seeds, using a machine called a drill.

F. The drill puts the seeds into the ground and covers them with soil.

G. The plants start to grow in the fall, and the roots stay alive in the ground all through the winter.

H. That is why wheat grown in this region is called winter wheat.

I. In the spring, the wheat begins to grow again, using the moisture stored in the ground.

J. Now the farmers look for and want rain, for the wheat will need more moisture to continue growing.

IX. Conclusion

A. If you would like to know more about this wheat farming, or about the Great Plains in general, you will have a chance to pick a book that will tell you more about it later.

GULF COAST OUTLINE

I. Introduction

   A. The Gulf Coast is one of the fastest growing areas in the Southern part of the United States.

II. Location

   A. This area, along the Gulf of Mexico, has a coastline nearly two thousand (2,000) miles long.

   B. The Gulf Coast runs from Southern Florida along Alabama, Mississippi, Louisiana, and Texas, to the Mexican border at the Rio Grande River.

III. Vacation Site

   A. One of the best known aspects of the Gulf Coast is its popularity as a winter vacation area.

   B. Located at its eastern end is Miami Beach, one of the largest and most famous resort centers in the South.

   C. Millions of people come to this area each year to enjoy the sunshine and warm water.

   D. Children who might be making snowmen if they were back home in Massachusetts or Minnesota build sand castles on the beaches of Florida.

   E. In the evenings, there is an endless variety of hotels, restaurants, and night clubs to suit everyone's taste.

F. Day or night, there never seems to be enough time to enjoy all the activities.

G. Not far from Miami Beach around the southern tip of Florida and northward along Florida's West Coast, there are many other well-known resort towns such as Naples, Fort Meyers, Sarasota, and St. Petersburg.

H. Attracting visitors has become one of Florida's leading industries.

I. Today, many people visit this area to see the sights, enjoy the outdoor activities, and relax in the warm sun.

IV. Agriculture

A. The sun is also important to farming twelve months a year.

B. During the winter season, when the northern areas of the United States are cold and snowy, gardens thrive along the Gulf Coast.

C. A profitable variety of crops are grown to supply local needs as well as those of neighboring states.

D. The Gulf Coast farmers found that there are many ways to take advantage of the land.

V. Soil

   A. The soil in this region differs from one area to the next.

   B. Sandy soil can be made productive with the use of chemical fertilizer.

   C. In some areas too much rain creates a problem:

      1. Every year heavy rainfalls soak the lowlands from Eastern Texas to Florida.

      2. Farmers must use pumps to remove excess water from the fields.

   D. In other sections of the Gulf Coast there is a scarcity of water.

      1. Irrigation ditches are used to bring water to the fields from upland areas where there is more rainfall.

   E. Swampland is being cleared and drained for the first time, leaving rich, fertile soil.

   F. With hard work and careful cultivation, farmers of the Gulf Coast are reclaiming land which was formerly useless.

VI. Citrus Crops

   A. A great variety of crops thrive in the Gulf Coast Region.

   B. In Florida,oranges are a major part of the crops which are sent to nearby canneries and freezing plants.

C. The growing of citrus crops, such as oranges, grapefruits, lemons, and limes is an important industry.

D. Florida and Texas produce well over half of all these fruits grown in our country.

VII. Rice

A. In other parts of the Gulf Coast, farmers use the water-soaked lowlands to grow rice.

B. Huge harvesters do most of the work.

C. They are similar to those that are used to harvest wheat and oats, with one big difference:

1. Large, soft rubber tires are used to support the tremendous weight of the harvester on damp, soggy ground.
2. Without these unusual tires, the machinery would be unable to move.

VIII. Sugar Cane

A. In Southern Louisiana, the mild winters permit the growing of sugar cane.

B. Sugar cane is also harvested by machine.

C. Giant cutters leave rows of cane to be lifted by large steel hands.

D. Most of its crop will be processed at nearby sugar mills.

IX. Ports

A. The Gulf Coast ports receive much fresh fruit coming into the United States from Central and South America.

B. When fruit such as bananas arrive, it is transferred from ships to trucks.

X. Conclusion

A. If you would like to find out more about the ports of the South, or more about the Gulf Coast in general, you will have a chance to pick a book that will tell you more about it later.

ROCKY MOUNTAIN AREA

I. Introduction

  A. One of the common sights in the Rocky Mountains is Forest Rangers.

  B. They work for the United States Forest Service.

  C. They live in Ranger Stations, but spend most of their days out in the field.

  D. They cover a lot of territory, checking to see that the National Forest Reserves are being used safely and in the best way possible.

II. Appearance

  A. Much of the country up in the Rockies is wild and rugged.

  B. Therefore not many people live in this part of the United States.

  C. There's lots of untouched land, with forests and snow-covered mountains.

  D. There's lots of wildlife too.

  E. This is high country, with mountain peaks over fourteen thousand (14,000) feet tall--and even a few glaciers.

III. Location

A. The Rocky Mountains stretch all the way from Canada almost to the Mexican border, from north to south across the United States.

B. They cut through Washington, Montana, Idaho, Wyoming, Utah, Colorado, and taper off southward at New Mexico.

C. The Rockies have been a challenge to people ever since the early days of America.

D. Many pioneers on their way to the gold fields of California thought of turning back when they saw those peaks rising from the Great Plains.

E. And even when they had crossed the mountains, there was more trouble waiting on the other side, with over four hundred (400) miles of desert land lying ahead.

IV. Inner Mountain Region

A. That land was the Inner Mountain Region.

B. It stretches all the way from the Rockies to the mountains of California and Oregon, and includes a part of every one of our Western states.

C. The Inner Mountain Region is mostly high, dry country, made up of broad plateaus, steep cliffs, and deep canyons.

D. Thousands of years ago it was a land of many rivers.

- E. But today, water flows through the riverbeds only when it rains.
- F. Many of the lakes have no outlet, and the evaporation of water has made them extremely salty.
- G. The Great Salt Lake in Northern Utah is five times saltier than the Pacific Ocean.

V. Water

- A. The Rockies play an important part in giving life to this desert land.
- B. In fact, more than half the United States would be unable to get along without water from the Rocky Mountains.
- C. The mountains receive water when winds filled with moisture blow eastward from the Pacific Ocean.
- D. As these winds rise and become cool over the Rockies, snow and rain fall, especially on the western slopes.
- E. When spring comes, the melting snow and rain form little streams.
- F. The streams join together to form rivers.
- G. The rivers flow down from the Rockies, bringing water to the land below.

VI. Continental Divide

- A. At the highest point in the Rockies is a ridge called the Continental Divide.

B. It is called the Backbone of the U.S.A.

C. On one side of the Divide, streams flow westward toward the Pacific Ocean.

D. They form rivers like the Columbia, the Snake, and the Colorado.

E. On the other side, streams flow eastward toward the Gulf of Mexico.

F. They form the Missouri River, the Platte, the Arkansas, and the Rio Grande.

VII. Trees

A. Much of the land in the Rockies is National Forest, such as Roosevelt National Forest.

B. It is owned by the United States Government.

C. Here in the mountains heavy rains make big forests of spruce, fir, and pine.

D. Lumbering is carried on in many parts of the Rockies, both on privately owned lands, and on publicly owned lands of the National Forests.

E. In the National Forests, lumber companies pay for the right to cut down a certain number of trees.

F. The trees that are cut down will be sent to sawmills or to pulp and paper mills.

G. In addition to providing for a future crop, those that are left standing will serve to protect the land when it rains, so that good topsoil won't be washed away.

VIII. Conclusion

A. If you would like to know more about the trees of the Rockies, or more about the Rocky Mountains in general, you will have a chance to pick a book that will tell you more about it later.

APPENDIX C

Teachers' Manual

NOTE: Appropriate Subject Matter Outlines would be added where the type of presentation called for it.

Dear

I would like to thank you all very much for the help you will be giving me in carrying out this experiment. Needless to say, I could not do this without you, and in the end, the success of what happens on Friday, May 31, depends upon your cooperation.

This manual is designed (1) to present the general background for the experiment, (2) the general design of the experiment, and (3) the specific procedures which I would like you to follow during the actual course of the experiment. I have tried to keep the background as general as possible, and to make the procedures specific enough to make you feel confident in what you will be doing.

Since I'm sure I haven't thought of everything, or even close to it, I want to discuss any problems with you. To do this, I will be available at Longden School all day Tuesday and Wednesday, and before school on the BIG DAY, FRIDAY.

I thank you again for your cooperation.

Sincerely,

Kenneth Silber

KHS/amy

I

BACKGROUND

ASSUMPTIONS

1. Affective, or attitudinal, learning is important in school.
2. Different media (including the teacher) are capable of yielding different levels of affective learning.

GOALS

1. To determine what levels of affective response each of four media is capable of eliciting.
2. To develop a taxonomy of media based on the levels of affective response they are capable of eliciting.

MEDIA AND AFFECTIVE LEARNING

The research and theory in the area of media and affective or attitudinal learning, which is very scarce at present, lends support to four conclusions:

1. Affective learning plays a significant role in a person's learning and behavior, and is therefore worthy of extensive study.
2. Affective learning does have some effect on cognitive learning.
3. There are three affective responses which are prerequisites for cognitive learning:
    - (a) Controlled or Selected Attention
    - (b) Satisfaction in Response
    - (c) Preference for a Value
4. Media can elicit the three affective responses that are prerequisites for cognitive learning.

THREE DOMAINS OF LEARNING

1. Cognitive--remembering and reproducing some information learning; solving some intellective task.
2. Affective--feeling, emotion; degree of acceptance or rejection; interests, attitudes, values.
3. Psychomotor--muscular or motor skill; manipulation of materials or objects.

(NOTE: The affective domain has long been ignored by educational and psychological researchers.)

THREE KEY AFFECTIVE RESPONSES IN EDUCATION

1. Controlled or Selected Attention--
   differentiation of aspects of a stimulus which is selected and attended to despite competing and distracting stimuli.
2. Satisfaction in Response--
   behavior is accompanied by a feeling of satisfaction, an emotional response, generally of pleasure.
3. Preference for a Value--
   the individual is sufficiently committed to the value to pursue it, to seek it out, to want it.

II

PROCEDURE

DESIGN OF EXPERIMENT

1. Affective Responses
    - A. Satisfaction in Response, or Interest--to be measured by capillary pulse pressure transducers connected to the students' fingers and to a chart recorder, while students view test slides.
    - B. Preference for a Value, or Action--to be measured by students' voluntary selection of a book.
2. Media
    - A. Film--to be approximately 6 minutes of a sound color motion picture on one of the subjects listed in 3.
    - B. Tape--an audio recording of the sound track of the film discussed in A.
    - C. Filmstrip--still pictures taken from the film and captions taken from the sound track of the film, with additional commentary by the teacher.
    - D. Teacher--teacher talking from an outline based on the content of the film, and using a map and a chalkboard.
3. Subject Matter
    - A. Geography of Regions of the United States
    - B. Four Regions will be chosen randomly from these: Central Farming Region, Great Lakes Area, Great

Plains, Gulf Coast Region, Middle Atlantic Seaboard Region, Rocky Mountain Area, Southern New England.

INTRODUCTION TO THE EXPERIMENTAL MATERIALS AND PROCEDURES SECTION

Hopefully, this section will outline very specifically the procedures for carrying out the experiment.

Please note that this section is individualized, and is concerned only with the media-subject-matter-order combinations for your class. Therefore, do not be alarmed if it is different from the corresponding section in someone else's book.

The materials and instructions are arranged in the order in which you will be using them.

First, for all, is the "Teacher Introduction to the Four Presentations." This is the lead-in to the experiment, and should be begun about 8:45 a.m. Note that there is room for student responses in this section; also note that this is the only time until the end of the presentations that it is allowed.

After the Introduction, the first presentation is ready to begin. Please turn to the page following the Introduction. There is a page of instructions, telling you which presentation will be first, how to introduce it, what procedures to follow, how to end it, and how to get to the next presentation.

Follow the same procedure for all four presentations. Please note that a short stretch is allowed for after the second presentation.

After the fourth presentation, there is a page of instructions and an outline for "Teacher Follow-up and Book Selection." Please be sure to actually go around and give out the books to those students who have written the names of areas on pieces of paper. Please try to eliminate as much cross-talk as possible during this period.

Next comes recess, as is regularly in your schedule.

The pulse pressure measurements will be taken for the fourth grade immediately following recess. Upon return from recess, then, the fourth-grade teachers should read the "Teacher Introduction to Capillary Pulse Pressure Transducers." The projectionist will be available to tape the transducer to your finger. He will then take four students to the c.p.p. room. After about 5 minutes he will return 2 of the students and take two more. This process will continue until all students have been measured. Please do not discuss the subject matter of the presentation while this testing is going on.

The pulse pressure measures for the fifth grade will be taken after lunch, in the same manner as described above. Again, please do not discuss the subject matter of the presentations during the remainder of the morning or during the measuring.

Thank you very much for your cooperation. If you have any questions, please don't hesitate to ask.

TEACHER INTRODUCTION TO THE FOUR PRESENTATIONS

(NOTE: Here, much more than in the script outlines which follow, there is room for you to take some liberties with the outline. The key here is to use the vacation theme to introduce the presentations, thus keeping all the introductions somewhat similar. What follows here is a possible approach. I think the last two lines should be more or less standard, however.)

A. Boys and girls, you had a vacation yesterday.

B. You have one this weekend.

C. But you have an even longer one coming up soon.

D. Who can tell me what this vacation is?

E. STUDENT RESPONSE (Correct--Summer)

F. Right, summer vacation is coming soon.

G. What kinds of things can you do on your summer vacation?

H. STUDENT RESPONSE (Correct--Travel)

I. Yes, one of the things you can do during your summer vacation is to travel.

J. You can travel to (FOREIGN COUNTRIES THEY MIGHT KNOW ABOUT).

K. Or you can travel around the United States.

*L. There are many different areas of the United States you can travel to, each of which is very different from the others.

*M. Now we're going to have a chance to find out a little about four of these different areas of the United States.

PRESENTATION # ___

NOTE:

This area will be presented to your class by FILMSTRIP, and by YOU, THE TEACHER.

To begin this presentation, please say:

> "The next area of the United States we will find out about is the
>
> ____."

NOTE:

At this point the projectionist will begin the filmstrip.

At this point, also, please turn the page where the outline for your part of the presentation starts.

You will note that the outline is marked to show the amount of the outline that is meant to be covered by each frame of the filmstrip.

As each frame comes on the screen, please read the caption, if there is one; then talk from the outline about any information that is supposed to be covered by that visual but is not included in the caption.

To signal the projectionist to change frames, please say

"Next."

NOTE:

When you have finished presenting the information for the last visual, the projectionist will stop the filmstrip. At this point, not before, please read the Conclusion in the Outline.

NOTE:

If this is the second presentation for your class, please have them stretch before going on.

The next presentation begins immediately following the last page of the outline.

PRESENTATION # ___

NOTE:

This area will be presented to your class by YOU, THE TEACHER.

To begin this presentation, please say:

> "The next area of the United States we will find out about is the
>
> ____."

NOTE:

At this point, please turn the page, where the outline for your presentation starts.

While you may use your own words in presenting it, please try to stick closely to the Outline, and please do not change the order of the material.

Please try to keep the presentation to about 5 minutes.

You may use a map to point out the location of the area.

You may also use the chalkboard if you think it is necessary, but keep in mind that the goal of the presentation is not to teach the facts in it.

NOTE:

If this is the second presentation for your class, please have them stretch before going on.

The next presentation begins immediately after the last page of the outline.

PRESENTATION # ___

NOTE:

This area will be presented to your class by FILM.

To begin this presentation, please say:

> "The next area of the United States we will find out about is the
>
> ____."

NOTE:

At this point, the projectionist will start the FILM.

When he stops the FILM, please say:

> "If you would like to know more about the ________________________________ Region, you will have a chance to pick a book that will tell you more about it later."

NOTE:

If this is the second presentation for your class, please have them stretch before going on.

Please turn the page for the next presentation.

PRESENTATION # ___

NOTE:

This area will be presented to your class by TAPE.

To begin this presentation, please say:

"The next area of the United States we will find out about is the

____."

NOTE:

At this point, the projectionist will start the TAPE.

When he stops the TAPE, please say:

"If you would like to know more about the ________________________________ Region, you will have a chance to pick a book that will tell you more about it later."

NOTE:

If this is the second presentation for your class, please have them stretch before going on.

Please turn the page for the next presentation.

TEACHER FOLLOW-UP AND BOOK SELECTION

(NOTE: Here, again, there is some room for you to take liberties with the outline. The *key* is to point out that *they have a chance to find out more about one, and only one, of the areas*, and that *selection of a book is purely optional*. Again, I suggest a possible approach.

A. Now you've had a chance to find out a little about four areas of the United States you could travel to.

B. This summer, though, you might not get a chance to take a real trip to one of the places.

C. But this weekend, *if you want to*, you can take an imaginary trip to one of these four places.

D. If one, *just one*, of those places you just found out a little about interested you, you can find out more about it.

E. I have books about each of the four areas, and *if you want to*, you can take one of them home to read and learn more about one of the areas.

F. Since there aren't enough books for everyone to learn about all four areas, you have to *pick just one* to visit.

G. Remember this is *not* a homework assignment, but is something you can do if you are interested in one of the four areas.

H. If you want to take a book, write down on a piece of paper the name of the area you want to know more about.

I. I'll come around and give you the book you want.

TEACHER INTRODUCTION TO CAPILLARY PULSE PRESSURE TRANSDUCERS

(NOTE: Once again, you can take liberties with the outline. The key here is to explain the c.p.p.t.'s, why they are being used, and to alleviate some of the anxiety that the students will have. We will do more of this when they come to the room where the c.p.p. equipment will be.)

A. Perhaps you noticed that while we were finding out about those four areas of the United States, there was a man in the back of the room.

B. This man is here because he needs our help.

C. You saw a film, a filmstrip, listened to a tape, and listened to me talk.

D. The man wants to try to sell these materials to the school.

E. But first, he wants to find out how you liked them.

F. You can be the judge of how good his materials are.

G. To do this, he is going to show you some pictures and get your reaction to them.

H. To get your reaction, he is going to tape a little thing to your finger, like this: (HOLD UP HAND WITH TRANSDUCER TAPED TO FINGER).

I. It doesn't hurt--all it does is tell him how you like the pictures he will show you.

J. O.K.? (ANSWER ANY QUESTIONS, ETC.)

K. Now he will take you two at a time to another room where the pictures are.

L. You'll only be there for about 5 minutes.

M. O.K.? (ANSWER ANY QUESTIONS, ETC.)